COSMETICS FLAVORS

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HARLAND J. WRIGHT, Editor and Publisher

ROBIN FOWLER Managing Editor LOUISE M. SERRA Assistant Managing Editor MAISON G. DENAVARRE, PH.C., B.S. Technical Editor

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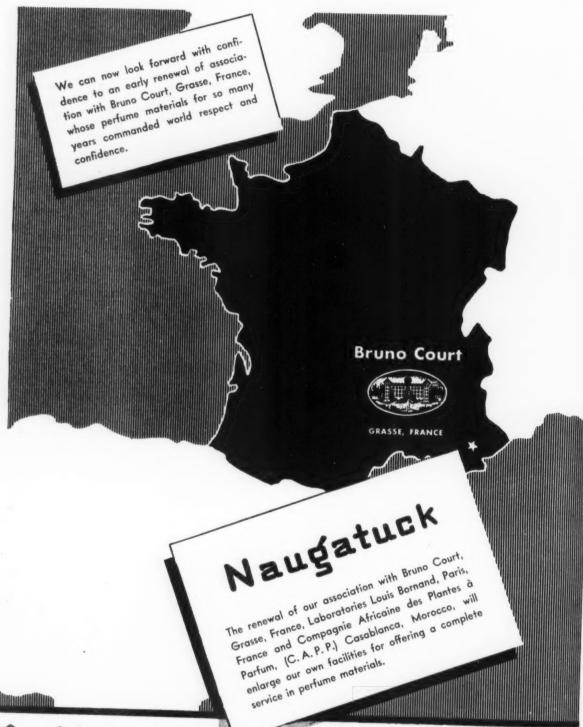
## Editorial Comment

Do We Face a Postwar Decrease in Business

Before the war, and especially now, the production of cosmetics has grown steadily, with volume dependent not so much on demand as upon the ability of the manufacturer to obtain materials, containers and the manpower to turn out the merchandise. We are faced with the question of the possibility of shrinking markets after the war is over, which may develop with mismanagement. With the tremendous upheaval which our economic system may pass through in its return to a peacetime basis, there should not be a tendency on the part of individuals to see to the well being of their business life at the expense of the industry as a whole. They may attempt to do this through a great many hurtful methods, among which, to list only a few, are: cutting quality to reduce price, the use of flamboyant advertising claims, aggressive tactics toward buyers in an effort to jam merchandise through outlets. Neither the merchants nor the public would support such a policy.

There are a number of variables, and some unforseeables, involved. But, good business practice at one time, and in one place, usually holds true universally. The answer then to employment, profit, prices and volume, should lie along the lines which have stood this business in such good stead in past times. First, and foremost, comes quality; but at the time when conversion comes there will be another prime factor which will be of almost equal importance, and that will be volume. By operating as we have in the past on a quantity basis we can insure full employment and a margin of profit to insure the progress of the industry.

This maintenance of volume need not come from dog eat dog competition, but from the opening of new markets. Through the more intensive education of the teen-age buyer, the cultivation of the shopper who through location or environment has not previously been a cosmetic buyer, and through the intensive cultivation of our export trade.





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# desiderata

Comment on interesting new chemical developments and their application to cosmetics and toiletries

by MAISON G. DENAVARRE

#### DE-SCALING WATER LINES

Equipment for de-mineralizing water is sometimes cumbersome and costly, perhaps too costly for modest needs. A unit I recently saw looks like a small anti-personnel land mine, about as big as the space covered by two hands when placed side by side. Units for any requirement are available, from around twenty dollars for the small ones upward. Descalers are used in boilers, water lines and water heaters. They remove all of the inorganic matter from water, but not the organic matter. To operate, a temperature of 140-160°F. must be maintained in the water. The units may be wired in single or multiple sets. By removing inorganic matter, corrosion and incrustation are prevented.

#### GREASE PLUGGED PIPES

Probably nowhere more so than in cosmetic plants is there so much fatty matter washed down the sewer. If in the basement, the danger from plugged up pipes is smaller than if one or more floors above. The grease loaded water lets the grease accumulate on the pipes until they are finally plugged. Then comes the expense and trouble.

All this can be avoided by placing a grease interceptor in the line. A unit rated at five gallons per minute is priced as low as thirty dollars. Simple to operate and clean, the units are non-corrosive and the cost of maintenance is low. A similar unit for removing plaster, metal, glass and other solids that clog drains is available for forty dollars. Fits in as part of the sink trap.

#### CREAM SHAMPOO

After looking over some six or

eight so-called popular cream shampoos, one finds the pH to run from 4.5 to 8.5. Some are very active in hard water while others are not much better than soap. Practically all are quite aerated, but some of the fluffedup foamy creams don't maintain their fluff so well. At least one was based on soap. The others contained from 85 per cent water down to about 65 per cent water. Some were colored, others were not. All contained an active wetting agent in varying amounts. The most effective contained most wetting agent. Since wetting agents as a group are poorly water soluble, one makes a paste with water, beats in a lot of air while the product is warm and in a plastic state, cools and behold a cream shampoo. Color and perfume to suit.

#### FLAKES VS. SLABS

The convenience of flaked or sprayed types of waxes and fatty acids in development work goes without saving. But in large scale manufacture, the bulk involved is too great and is often a detriment. The large, twenty to thirty-pound slabs are too big and require breaking up. That means waste and additional labor. Why don't the wax and fatty acid people develop a mould that will form a one-pound brick with flush edges, so that twenty, thirty or forty can be layed in a layer in a box, occupy no more space than a slab of the same weight; but look at the convenience in handling. No waste. No need to break up the slabs. Just dump them in. In fact, weighing can be sort of double checked by virtue of the number of bricks or brickettes used from a box, or the number left in a box after use. Every cream man in the world would love you wax and



M. G. DeNavarre at work in his laboratory

fatty acid suppliers for this. Maybe even buy you a carton of popular cigarettes for Christmas.

#### COATING TANKS

Another coating material made of plastic is offered to be brushed, dipped or sprayed on metal parts, wood, cement, tile, etc., to render it resistant to acid or alkaline attack. Start with a clean sandblasted surface. Apply one coat, followed by from two to seven more coats. Allow each coat to dry at least twelve hours before applying the next one. After the last coat, allow the painted object to stand in air for ten days to two weeks before using. The paint comes in a variety of colors. It is heat resistant to 212°F in the wet form and to 300°F in the dry form.

#### HAIR WAVING

Inasmuch as no one has studied hair waving as thoroughly as the textile interests have studied wool, any explanation of the mechanics of waving is based on studies of the behavior of wool, because wool resembles human hair very closely. In doing so, one must fully realize that all of the theories regarding structure of wool and its behavior are in a state of flux. Perhaps the ones that have had the benefit of most criticism are those proposed by Astbury and Speakman about 1930. Their original theory of the coiled hexagonal structure of unstretched keratin has finally been shown to be wrong by Neurath and others who built scale models to disprove the



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coiled structure. Other theories now proposed do not have the benefit of the ten or more years of scientific criticism of the theories of Astbury and Speakman. Not only is it with the physical structure of keratin, but also the reactions of keratin with chemical reagents. It is particularly true of any substance as complicated as keratin, susceptible to so many possible side reactions.

So that hair waving may be better understood, one must accept as a basis some theory, preferably one having the benefit of years of criticism. This I did in the article on permanent waving appearing in this issue of THE AMERICAN PERFUMER. I used the theories of Astbury & Speakman because they explained so many things so well. Yet I shall be the first to admit that theory and practice are sometimes as far apart as the north and south poles. Such happens to be the case when it comes to waving hair by the so-called cold methods using mercaptans like the thioglycollates. According to one theory they should not work so well. But we know in practice that they seem to work even better than older alkaline sulfite solutions, in that they give the hair a nicer feel, in the hands of a good operator. All this only

#### W.P.B. COSMETIC DEFINITIONS

exaggerates the insufficiency of pres-

ent knowledge to satisfy all require-

ments. But more is being learned

every day . . . even by those who

admit inadequacy of their own views.

The new lanolin order carries a swell interpretation of a cosmetic. It in essence repeats the Food & Drug Act definition. But it fails to understand that there are a lot of things that are applied to, sprinkled on, etc., the body and which enhance the appearance of the body thereby, yet which are generally thought to be drugs. Any ointment used to relieve the discomforts of common skin ailments is a cosmetic under such a definition, and its maker cannot get or use lanolin to compound it. Protective creams beautify by preventing ugliness resulting from industrial hazards. So now they become cosmetics. A disinfecting foot powder that is sprinkled between the toes. preventing spread of athletes foot all over the user's legs and hands and elsewhere, is also a cosmetic by the same reasoning, because it prevents ugliness thereby acting as a beautifier. A shower bath is a cosmetic it sprinkles on, while you wash away dirt and B.O., thereby becoming more beautiful.

And the W.P.B. is also apparently doing the same kind of reasoning. What gives? Under such wonderful agreement, an item may be considered a cosmetic by W.P.B. or W.F.A., not a cosmetic by the Treasury Department and a device by the Food and Drug Administration.

#### INCOMPATIBILITY

If you are making a hydroalcoholic lotion using a water solubilized perfume, take care if you add an astringent chemical such as a salt of zinc or aluminum. You will probably get a slow clouding at first, which will eventually turn into a curdy precipitate of either the solubilizer or a complex of it and the astringent salt with the perfume. If the finished lotion has not been aged sufficiently, you will not know about it until it gets on the store shelves. In fact, a straight watery lotion will do the same thing.

But a hydroalcoholic lotion will take longer because of the solvent action of the alcohol on the precipitated complex, the more alcohol present, the greater the delay. Under some conditions, a high alcohol concentration may even prevent the precipitation.

## **Questions and Answers**

#### 520. LIQUID ROLL-AWAY CREAM

Q: Sometime ago in your Questions and Answers column, you published a formula for a liquid roll-away cream, like a liquid massage cream that rolls off as it is massaged into the skin. It was a stearic acid base, I believe, but I don't seem to be able to locate the formula in my file. Enclosed, stamped envelope is for your convenience.

Q. S.-Missouri

A: At the moment, we do not know of a formula for the type of preparation you refer to and in checking back a number of issues of THE AMERICAN PERFUMER, we do not find it. We have seen such preparations on the market and suspect that you are probably right in your belief that it is a stearic acid base. If, on checking through older files, we find the particular formula, we will send it to you under separate cover.

#### 521. HAIR LOTION

Q: We would like to add to our line of men's toiletries a fine hair lotion. We prefer a lotion which gives a pleasant feeling to the scalp. We are enclosing a self-addressed, stamped envelope and hope you can supply us with the formula.

A. H.-Maine

A: A satisfactory hydroalcoholic product contains in the vicinity of

50 per cent alcohol to which have been added other ingredients that will act as a hair dressing as well as any special therapeutic agents that you may wish to include. The following formula will give you an indication as to how the product may be made. Alcohol 50 per cent, Soluble Dressing Ingredient 1 per cent, Pilocarpine Hydrochloride 1/4 per cent, Glycerine or Propylene Glycol 3 per cent, Resorcin Monoacetate 2 per cent, Water, Color and Perfume to make 100 per cent. A product of this type contains reputed ingredients of value for the hair roots and scalp as well as some hair dressing properties.

#### 522. COLD WAVE DEVELOPMENTS

Q: Sometime ago you ran a short article on cold permanent waving. Are there any new developments? Are there any manufactured that do not use thioglycollates.

S. I. G.—Pennsylvania

A: The cold permanent waving field is seeing many developments. These are being reported in THE AMERICAN PERFUMER as quickly as we can learn about them. Most cold waving solutions on the market use thioglycollates, although there are one or two that do not. We are giving you the name of several suppliers of thioglycollates who can supply you with a concentrate or a finished solution for resale.



natural Rose oil it is invaluable. A Chuit, Naef product, ample stocks are available in this country-\$58.00 per pound-a trial ounce \$3.75.



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# Propylene Glycol

# From Substitute to Primary Use

Propylene glycol as a vehicle, penetrant, solvent humecant and preservative . . . Its use in food, cosmetic and other industries

by L. S. ROEHM
The Dow Chemical Company

PREVIOUS to the war, large quantities of glycols were being produced in this country, the most common usage being ethylene glycol for anti-freeze. Of these glycols, propylene glycol was produced in very small quantities and not a great deal of development and research was undertaken.

Although early indications showed that it had properties which would be of considerable importance to industry, the point had not been reached where it was investigated extensively. The contingencies of war always necessitate substitute materials in order to release more critical ones for first-line duty. Due to this factor, propylene glycol immediately became of tremendous importance as a replacement for other chemicals and its production increased from a few thousand pounds per month to over a million. As a primary-use product, it is becoming so well established today that it can now be classed as one of the newer chemical compounds applicable to manifold industrial uses since, in many cases, its physical and chemical properties render it more satisfactory than materials previously

Propylene glycol has, for the past two years, been widely discussed and widely used. It is one of a large family of glycols, all of which exhibit somewhat similar properties due to the two hydroxyl groups present. The chemical and physical properties of the glycols, unique because of this presence, include properties of many other alcohols, and thus their extensive use in practically all industry.

#### PHYSICAL PROPERTIES

Although all the glycols show marked hygroscopicity, low freezing point, excellent plasticizing, solvent and preservative properties, propylene glycol is outstanding in that it is extensively used in products which the average person daily consumes or uses, such as food, medicine and cosmetics, to name a few.

It is a clear, colorless, practically odorless, slightly viscous liquid which boils at 185°-190° C. and weighs 8.62 pounds per gallon. It is miscible with a wide variety of solvents; water, chloroform, acetone, alcohol and other organic liquids, and is a solvent for many organic and inorganic compounds. Aside from purely chemical and physical properties, propylene glycol is relatively nontoxic as evidenced by toxicological studies (1, 2, 3, 4, 5, 6, 7) summarized in the follow-"Propylene glycol in the amount normally used is permissible to replace glycerine or other solvents in food products without violating the requirements of the Federal Food, Drug and Cosmetic Act." Trade Communication 374, December 10, 1941, Back reference-3032.

With further reference to correspondence published by the Food and Drug Administration the following statement is found: "Our Division of Pharmacology has conducted extensive investigations which will be published on both the acute and chronic toxicity of propylene glycol and in addition we have been advised of similar investigations conducted in other laboratories. Careful review of all of the available results does not show that in the amount normally used in food products propylene glycol is to be regarded as a harmful ingredient."

Aside from the known fact that propylene glycol has found many industrial outlets, let us consider its use specifically in some of these fields; fields where this chemical has more than proved its superior value.

In the tremendous food manufacturing and processing field, propylene glycol is used as a vehicle, penetrant, solvent, humectant, antifreeze and preservative. Many extracts and flavors can be suitably formulated using propylene glycol, and in so doing, one chemical plays the role of solvent, vehicle and preservative and if necessary the role of anti-freeze. No other commonly used chemical is so versatile when cost is considered along with its chemical and physical properties.

#### USE IN FLAVORING

Data in tables 1 and 2 show solubilities of some flavoring materials in propylene glycol, as well as comparative data as related also to alcohol and glycerine. Many of the

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flavoring houses in this country have much additional information which indicates that, by proper processing, propylene glycol can be used with hundreds of flavoring materials and even in chemical extraction of fruits, nuts and beans. All of this naturally carries over into the soft drink, candy and actual food processing field where flavors are used extensively and where this chemical has withstood critical examination. Where table syrups, flavors and other foods are packaged for home consumption, propylene glycol has been found to be an excellent preservative since it is effective in preventing fermentation and mold growth. A better shredded coconut Varying amounts of propylene glycol are used (2 to 15%), depending upon the degree of preservation required and the amount of moisture present. In such foods, the glycol acts, too, as a humectant and flavor retainer, and thus eliminates the use of other materials for specific properties as well as considerably reducing costs.

#### USE IN COSMETICS

The cosmetic industry is one of the largest consumers of chemicals which must have properties as exhibited by the glycols. These chemicals must be good humectants, solvents, emollients, penetrants and spreaders. Propylene glycol as well monly used and furthermore it has advantages in many creams where its greater volatility is desired. leaving a soothing effect, and where the texture and "feel" of original products are improved. Propylene glycol here again, as in other fields, is a chemical that is versa. tile and, therefore, one chemical can be used instead of several to impart the desired properties and functions as listed above. Whether used in small or large amounts, this chemical, as used in the cosmetic industry, adds its distinctive properties with the result that it has established itself as a most valuable and preferred tool in many formulations; to make a better product with reduced manufacturing costs.

The same properties which make it desirable for use in the food, flavoring and cosmetic field, indicate its importance in pharmaceutical formulations.

The manufacturer of pharmaceutical preparations, whether for internal consumption or topical application such as vitamin concentrates, elixirs, salves, ointments, creams and antiseptics, must first solve the problem of finding a solvent for the medicinal to be used in his preparations. This solvent must not only be a good carrier for the compound, but neutral in its effect on the human system. Propylene glycol has been found to possess these qualifications and in addition act as a preservative.

A specific instance, recently reported from a hospital pharmacy, indicated that quinidine can be made injectable by dissolving in propylene glycol, a method which the medical profession has been in need of for some time (9).

The versatility of propylene glycol's solvent properties, as shown in table 3, extends to serums and many organic chemicals commonly used for germicidal purposes. This dictates its use in many biological serums, antiseptics, salves, ointments and numerous other types of pharmaceutical preparations. The solubility information contained in the table covers but a few materials but gives an indication of the ultimately broad scope of uses for this chemical.

While propylene glycol is now playing an important part in the food, pharmaceutical and cosmetic fields, it is also being used in a large

TABLE I-SOLUBILITIES OF FLAVORING MATERIALS IN VARIOUS SOLVENTS

Flavoring	Temp. °C.	95% Ethyl Alcohol	Propylene Glycol	Glycerine
Oil of Orange	30	0.5%	0.3%	0.4%
	25	3.03%	0.26%	0.35%
Oil of Lemon	30	60.0%	0.6%	0.4%
	25	65.90%	0.81%	0.59%
Benzaldehyde	30	50.0%	50.0%	2.44%
	25	Completely	Completely	3.56%
		Miscible	Miscible	
Vanillin	25	44.35%	21.65%	*4.59%
	25	47.15%	23.10%	4.38%
Coumarin	25	17.82%	7.18%	*0.80%
	25	18.65%	6.77%	0.80%

<sup>\*30°</sup>C.

is available where small amounts of propylene glycol are used as a preservative (8) and this same problem arises with many other packaged foods where a certain amount of moisture needs to be present to offer a suitable consumer product.

as its esters have been found by cosmetic manufacturers to work exceedingly well in the many formulations for creams, lotions, jellies, rouges and other toilet goods. Propylene glycol compares favorably with other humectants com-

TABLE 2
SOLUBILITIES OF FLAVORING MATERIALS IN PROPYLENE GLYCOLWATER MIXTURES
(Temperature 25° C.)

	Per Cent Gylcol										
100	80	60	40	20							
Flavoring Material	Per cent Flavor	ing by Weight	in Total Mixture								
Amyl Acetate Misc.	Misc.	Misc.	1.48	1.34							
Iso-Amyl Formate Misc.	5.22	4.51	1.68	1.53							
Benzaldehyde Misc.	18.97	4.62	1.80	0.82							
Cassia Oil Misc.	3.13	0.85	0.69	0.21							
Citral Misc.	0.35	0.17	0.10	0.04							
Clove OilMisc.	1.19	0.26	0.24	0.12							
Ethyl Acetate (99%)Misc.	Misc.	Misc.	11.65	8.09							
Ethyl Formate Misc.	Misc.	Misc.		17.45							
Eucalyptol	4.75	1.73	0.35	0.25							
Lemon Oil 0.81	0.52	0.32	0.13	0.03							
Nutmeg Oil 1.53	0.34	0.17	0.14	0.11							
Orange Oil 0.26	0.13	0.08	0.06	0.03							
Phonyl Ethyl Alcohol Misc.	Misc.	Misc.	18.95	3.11							
Sassafras Oil 2.02	1.21	0.20	0.12	0.08							
Coumarin 7.70	5.05	2.30	0.50	0.32							
Vanillin	20.10	12.60	5.85	2.09							
Ethyl Vanillin	10.80	5.20	1.84	0.79							
Methyl Salicylate 17.05				-							
Methyl Anthranilate Misc.	Misc.	Misc.									

number of other industries which make use of it in the following ways: as a hygroscopic agent, preservative and spreader in tobacco; as a component of brake fluid compositions; as a plasticizer and hygroscopic agent in adhesives; as a solvent and spreader in inks and dyes; as a plasticizer, solvent and hygroscopic agent in the manufacture or processing of leather, paper, resins and film. Additional uses, such as a recent development where it was used in air sterilization (10, 11), will no doubt be found and many of its present uses improved upon.

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which can be added the results of studies carried out by federal, state and private research laboratories.

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#### TABLE 3-SOLUBILITY OF PHARMACEUTICAL PRODUCTS IN PROPYLENE GLYCOL\*

		Indication of Solubili
ı.	DRUGS AND MEDICINALS	in Propylene Olycor
**	Sulfanilamide	10%
	Sulfathiazole	
	Sulfapyridine	
	Sulfadiazine	
	Antipyrine	
	Sodium Iodobismuthite Sodium Bismuth Thioglycolate	
	Phenobarbital (Luminal Sodium)	
	Paraldehyde	
		very soluble
2.	LOCAL ANESTHETICS	
	Diothane	5%
	Benzocaine	
	*********	aqueous solutions
	Salicyl Alcohol (Saligenin)	
	Benzyl Alcohol	20%
1	ANTISEPTICS	
91	Hexylresorcinol	Soluble
	Thymol	
	Menthol	>50%
	Camphor	
	Trichlor-tert, butanol	
	Chlorothymol	Soluble
4	VITAMINS AND HORMONES	
70	Vitamin A	Soluble
	Vitamin D	
	a-Estradiol	
	Desoxycorticosterone Acetate	Soluble
	Stilbestrol	Soluble
5.	ORGANIC SUBSTANCES	
5.	Phenothiazine	Soluble
	rnenormidzine	Joidbie
6.	INORGANIC SUBSTANCES	
	Bismuth Hydroxide	Soluble
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\*See Bulletin of the National Formulary Committee, Vol. XI, Nos. 5-6, May-June, 1943, pps. 91-98 and XI, Nos. 9-10, Sept.-Oct., 1943 pps. 184-186.

Much is yet to be learned about propylene glycol, where and how it can be used, but this is necessarily the position of any manufacturer pioneering the production and distribution of a new product. It should be stated, however, that with priorities lifted and the wider use of propylene glycol, the manufacturers of this chemical through their own research facilities will accumulate more data each day to

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#### Mexico Limits Chicle Export

The Mexican Government has limited the amount of chicle which may be extracted during the 1944-45 season to 4,106,600 kilograms. This chicle will be gathered from national, private and common or public land. Producing areas are the State of Campacho, and the Territory of Quintana Roo.

#### U. S. S. R. Glass Jars

A new factory for the manufacture of glass jars has been set in operation in the Georgian S. S. R. One conveyor line is now in operation, with four more scheduled to be opened.

## **Short Adages**

by R. O'MATTICK

THE compounder of this column is ever on the alert for references in literature to matters perfumerial and cosmetical. From time to time, these years past, he has quoted authors erudite and humorous, light and ponderous, famous and miscellaneous. Shakespeare, Saltus, Melville, Malherbe and hosts of others have writ on perfumes.

It is with much pleasure that we reprint here "Smells" from the poems of Christopher Morley (Doubleday, Doran & Co. 1929), with Mr. Morley's own permission.

#### Smells

Why is it that the poets tell So little of the sense of smell? These are the odors I love well: The smell of coffee freshly ground: or rich plum pudding, holly crowned; or onions fried and deeply brown. The fragrance of a fumy pipe, The smell of apples, newly ripe, and printers' ink on leaden type. Woods by moonlight in September Breathe most sweet; and I remember Many a smoky camp-fire ember. Camphor, turpentine and tea, The balsam of a Christmas tree, These are whiffs of gramarve A ship smells best of all to me!

This, too, is by Christopher Morley-

#### Smells (Junior)

My daddy smells like tobacco and books.

Mother, like lavender and listerine, Uncle John carries a whiff of cigars, Nannie smells starchy and soapy and clean.

Sandy, my dog, has a smell of his own

(When he's been out in the rain he smells most).

But Katie, the cook, is more splendid than all-

She smells exactly like hot buttered toast!

The poets (and other writers as well) tell "so little of the sense of smell," because odors are even more



difficult to describe than colors or sounds. Mr. Christopher Morley knows this, and he must appreciate the fragrances he describes, for the pictures he paints of odors by means of suggestion are 'truly "whiffs of gramarye"—the very same Christopher Morley who wrote Kitty Foyle, a novel in which the perfume and cosmetic business is a real part of the story.

Over three hundred years ago Sir

Francis Bacon wrote his famous Essays—one of them, Oh Gardens, He said: "That which above all others yields the sweetest smell in the air is the violet, specially the white double violet ... next to that the musk-rose."

Whenever, kind reader, you run across anything of interest about odors, smells, perfumes, cosmetics, et cetera, we shall appreciate hearing from you.

#### Aid for the National War Fund

Editor's Note: Appeals for the National War Fund—a federation of all major war-related philanthropies except the Red Cross—will be carried on this fall through forty-eight state organizations and 10,000 communities. The following statement, we feel, indicates exactly why this appeal should be answered generously by everyone in his local community.

#### FEDERAL BUREAU OF INVESTIGATION UNITED STATES DEPARTMENT OF JUSTICE WASHINGTON, D. C.

War makes a battleground in every area of human need. At home, it has accentuated the problems of broken homes, wayward boys and girls, blighted lives. On the military front it has brought the off-duty wants and needs of the fighting forces and the enervating effects of prison life on war prisoners. In the overrun countries of our Allies, it has created disease, want, privation.

Each of the agencies of the National War Fund, working with local united campaigns, is ministering to vital human needs not otherwise met on these three major fronts. Millions of lives—at home and abroad—depend upon the services and relief which are made possible only by the wholehearted voluntary support of community war funds. It is a democratic privilege to give freely.

(Signed) J. EDGAR HOOVER DIRECTOR

# **Emulsions, Emulsification**

# and Emulsifying Agents

Fifth and last article of the series . . . Color of emulsions . . . Transparent emulsions . . . Emulsification procedures . . . Typical emulsion formulas

by LOUIS T. MONSON

THE first four sections of this presentation have been concerned with the composition of emulsions, the general characteristics of emulsifying agents and the different classes of such materials commonly in use, and various other attributes, properties, and characteristics of emulsion systems, such as stability, inversion and viscosity. In the present and concluding section, it is proposed to mention several additional points, and then to proceed to a review of the whole subject through the use of a number of examples.

#### THE COLOR OF EMULSIONS

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The color of emulsions deserves passing mention. It is well known that emulsions are usually not as dark-colored as their component liguids. In fact, many emulsions comprising a very dark liquid and a lighter-colored one are very much lighter in color than either. It is also evident that practically all emulsions commonly encountered, with certain few exceptions to be noted below. are opaque, whereas the component liquids are quite as commonly transparent. If a transparent liquid be examined in a glass container, light rays from objects beyond the container pass freely through the liquid, reach the eye and register as vision. We say we can see through such liquids. Now, if we place another liquid on top of the first in the container and look down through the two layers at an angle, we usually find that positions of objects beyond are displaced in a definite way. The commonest example is the stick or pencil which seems to break where it enters the second liquid, and to be displaced throughout the latter. This observation illustrates the property of optical refractivity in liquids. In an emulsion there are many droplets of dispersed liquid in the path of any light ray which seeks to penetrate the body of the emulsion. Each time a ray enters such a dispersed drop, if the refractive indices of the liquids differ, it is refracted or bent, and comes out at an angle different from that at which it entered the drop. If it attempts to enter the drop along a very slanting line, at an acute angle, it will not in fact enter the drop at all, but will be reflected from the drop's surface. As the size of the dispersed drops is reduced, the ability of light rays to enter them is likewise reduced, and more and more of such rays strike the drops at more acute angles, or at greater slants. Consequently, the number of rays reflected is increased. Some of the rays are reflected from a number of drops, and some finally leave the body of the emulsion in the very direction from which they came originally. If the light which impinges on the drops is white light, as approximated by daylight, the emulsion will appear progressively whiter as more rays are reflected back to their source. As the particle size of the dispersed drops becomes smaller, the greater is the number of rays reflected. Therefore, the finer the degree of dispersion, the more nearly white it becomes. At the same time, since only a very small portion of the rays can penetrate the emulsion completely, the more nearly opaque it becomes. Emulsions are consequently usually opaque; and they are lighter-colored than their components if the latter are of any color deeper than white.

#### TRANSPARENT EMULSIONS

It has just been stated that light rays are refracted if they pass from one medium to another of different optical density; that, in the average emulsion, the degree of refraction is so great that substantially no rays completely penetrate the liquid mass; and that emulsions are as a consequence generally opaque. Where two liquids have the same refractive index, the emulsion produced from them should (neglecting emulsifier effects) be a true transparent emulsion. Such emulsions do exist.

There is another class of liquid system which is sometimes known as a transparent emulsion, which is probably not properly an emulsion at all. Such "transparent emulsions" are colloidal sols or "micellar" solutions. Whereas a true emulsion, however homogeneous it may appear to the naked eye, is clearly shown to be heterogeneous by examination under the microscope, a micellar solution appears homogeneous even under the microscope. Its dispersed particles are of sub-microscopic or colloidal proportions.

Micellar solutions are sometimes oil-continuous systems, as in the case of so-called soluble oils. In others, they are water-continuous. They are in general broadly characterized by containing a fourth class or kind of component, in addition to the two conventional liquids of emulsions, one oily, the other aqueous, and a third material which is usually easily identified as an emulsifying agent. The additional component is variously known as a mutual solvent, a hydrotropic compound, a semi-polar common solvent, a solubilizing agent, or even as a amphipathic substance. The class includes alcohols of various types, cresols and other materials, depending on the particular system in question. The amount of common solvent required also varies with the composition of the system; but in oil-continuous systems in which soap is the emulsifying agent it has been suggested that the common solvent should approximate the soap in molar or chemical equivalent proportions.

As examples of such "transparent emulsions," the following formulas are among those noted in the literature:

#### Composition A

Oil	150	parts	by	volume
Water	100	66	66	66
Soap	50	66	66	66
Alcohol	40	44	66	66

#### Composition B

Oil	150	parts	by	volun
Water	100	44	66	64
Soap	100	44	66	66
Amyl Alcohol	100	66	64	44
Mixed Cresols	60	64	66	66

These are said to be quite stable, and to show little or no Tyndall effect (a light test for the presence of small particles dispersed in a liquid). It is presumed ethyl alcohol is intended in the first example. The type of oil employed is not stated as to either example.

One theory advanced to explain the phenomenon of micellar solutions is that the molecules of common solvent take up oriented positions about the droplets of dispersed phase (water, in the above cases) along with the particles of soap emulsifying agent, and act to form complexes with the soap molecules.

On moderate dilution with water, oil-continuous systems of this type are transformed into opaque waterin-oil emulsions of increasing viscosity. Dilution of this viscous emulsion with oil produces a reduced viscosity (because of a lowered proportion of dispersed phase-see part four, September, 1944, of the present article): but the opacity remains. On addition of still more water, the system inverts and a stable oil-in-water emulsion, usually opaque, is formed. In some cases, addition of an electrolyte during preparation of the micellar solution acts to clear the last traces of translucence and produce a transparent system.

Transparent liquids of the micellar solution type find uses in commerce in various arts. For example, a recent advertisement notes: "Many delicate perfumes and rich flavors are built from oily bases that are diluted. Until recently, volatile solvents such

as alcohol were used. They were costly and hard to obtain. A search began for some relatively inexpensive solubilizing agent which would make a clear solution of those 'insoluble' oils in water." The advertiser's materials are said to meet this need. The advertising copy then continues: "These surface-active agents decrease the normal reluctance of dissimilar materials to mix . . ." and adds that the solutions produced are "usually clear." It seems apparent that at least some of such solutions are of the type under discussion.

In the case of cutting oils, used as lubricants and coolants in metal working, it is sometimes desirable to be able to view the work through the cutting oil or coolant being used. A transparent liquid of the micellar solution type answers this need satisfactorily; and such liquids are being sold for this purpose today.

#### EMULSIFICATION PROCEDURES

As stated in part one of the present article, emulsions are still produced in time-honored ways, usually by stirring or by passing the liquid components through restricted orifices or passages in pipes, valves, homogenizers, or colloid mills. Different systems require different treatment for optimum emulsification; but in all cases the operation is one of shearing the liquids and subdividing them into as small particles as desired. In this procedure, of course, both liquids present are so subdivided; but the presence of the emulsifying agent results in the coalescence of the droplets of only one liquid. To be effective, the emulsifying agent must move to the surface of the drops of liquid to be dispersed, or to the interface or boundary between such drops and the drops of the other or dispersing liquid, with sufficient rapidity to stabilize the drops of the first liquid. It has already been emphasized that such movement of the emulsifier, although rapid, is of finite velocity, and that definite changes in emulsion stability occur with the passage of

The work of emulsification goes to overcoming the cohesive forces which bind the molecules of a liquid. Production of a multitude of small drops from one large one or from a body of liquid is accompanied by an enormous increase in surface area. If we recall the discussion in part one here-

of, we will remember the example of surface tension involving the spontaneous coalescence of a small drop and a larger drop of a liquid. This is a specific case of the broad truth that surface tension forces act to prevent the extension of surface—or, to put it another way, surface tension forces are cohesive forces which operate to prevent the subdivision of a liquid into smaller drops. The work of emulsification must, therefore, overcome such forces.

Emulsification may be effected by a number of general procedures. For example, if it is desired to produce an oil-in-water emulsion stabilized by a soap-like substance, one may (1) add oil and water alternately to a concentrated soap solution; (2) make an aqueous solution of the soap and stir the oil into this solution; (3) make a solution of the soap in oil, which solution will emulsify spontaneously when poured into water; (4) mix an aqueous solution of the desired alkali and an oil solution of the desired fatty acid. In the last procedure, the soap is produced in situ from the alkali and the fatty

One author says Procedure (1) is preferable for emulsifying vegetable oils, Procedure (2) for waxes, Procedure (3) for mineral oils, and Procedure (4) for petroleum solvents. It is probable, however, that trial-and-error will still be the plan most employed in deciding which procedure to adopt, because there are just too many variables in any system to permit of broad generalizations.

An article written some five years ago on the selection of proper emulsification procedure stated: "Despite numerous attempts to reduce mixing and emulsification to a science, little progress has been made." The author then developed a principle which he asserted had been proved by extensive use. Its features are that the amount of work required to produce emulsification is definite and calcuable; that in part it goes to shear or break the liquids into droplets, in part to produce electrical charges on the film of emulsifying agent present in the agitated mass; that, since both liquids are being dispersed and are receiving such electrical charges, a dynamic equilibrium is set up between emulsification and demulsification rates, with only a part of the work being usefully applied in emulsification, the remainder being wasted in producing heat and promoting demulsification. Greater power, within limits, shortens the emulsification period; but greater power results in greater charging of the continuous phase and greater loss as heat. Therefore, for any system, he declared there is an optimum rate of shear (or application of power), determined by the rate at which the emulsifving agent film will accept surface charging. This optimum, he says, occurs where the emulsification rate is in the neighborhood of 1.2 times the demulsification rate. While this brief statement of the theory may make the validity of the conclusions appear highly debatable, the above value is said to have been derived from actual experiments in which agitation was continued till demulsification was effected, the results being plotted to obtain the figure quoted.

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In two-stage emulsification or "premixing," so commonly practiced. power requirements for the first-stage production of unstable emulsion may differ widely from those of the second-stage or stabilization emulsification. Pre-mixing in a separate vessel is indicated in such cases. Where the power requirements are substantially the same, the two stages of emulsification may economically be conducted in a single vessel. Pre-mixing appears particularly desirable where the finishing of emulsions is accomplished in a colloid mill or homogenizer. This is true, first, because the higher the level of homogeneity achieved in the pre-mixture, the less is required to be accomplished in the finishing equipment, and the higher is the capacity of the equipment; and, second, because it is generally true that the higher the homogeneity attained in the pre-mixer, the less likely is spotty or local over-shearing in the finishing operation.

Another discussion of emulsions says, as to colloid mills: "In connection with stirring, the advisability of using colloid mills should be given consideration for emulsions requiring exceedingly high stability and uniformity. . . . A product results in which the oil particles have been reduced to an exceptionally fine and uniform size and hence have great stability. With such machines, an emulsifying agent is still necessary, although the amount may be reduced to a minimum."

The individual operations of mechanical emulsification are too many and too specific to be recorded or discussed here. The phase volume ratio, the order of addition of the components of the emulsion, the type and continuity of agitation or shearing, the temperature, etc., all enter the picture. Intermittent agitation is sometimes of notable importance in promoting emulsification. Rapid addition of one or more components is sometimes vital to the success of the process. One author, discussing a wax emulsion, notes that rapid addition of water is required, to produce inversion (see part four, above), and states that this is a fact "first discussed by Quincke in 1868 and usually re-discovered, after painful experiences, as by the author in 1933."

An interesting observation that may be made when using a small piston-type emulsifier in the laboratory to produce an emulsion having a high proportion of dispersed phase is that the emulsion suddenly "sets" during a single piston stroke. Prior to that point, the stroking was accomplished with little effort; but subsequently the piston may be moved only with much greater effort.

In all consideration of emulsification technique, it must not be forgotten that the desideratum is not invariably the most stable emulsion possible to be prepared. In some instances, emulsions of medium are sought; while in others very unstable emulsions are desired, so that the phases may be separated completely after brief intimate contact.

The reader is referred to a recent symposium on agitation and mixing (Industrial & Engineering Chemistry, 36, 487, [1944]), where a few statements relating directly to emulsification are included in the detailed mathematical examination of the principles underlying agitation and mixing.

#### TYPICAL EMULSION FORMULAS

To summarize some of the foregoing information, it has been thought best to set down a number of emulsion formulas used in different arts or fields of endeavor, and point out their respective features. Reference to the appropriate sections of the present article will offer the reader a review of the principles or points involved in each such emulsion. Patented compositions have been

avoided so far as possible, for a number of reasons.

Mayonnaise has many variations; but one formula found in the literature is as follows:

Egg Yolks	10.0%
Salt	1.5%
Sugar	2.5%
Mustard (dry)	
Vinegar (5% solution).	
Water	3.4%
Corn Oil	72.0%

The ingredients are run through a colloid mill to produce the mayonnaise. Here we have corn oil dispersed in an aqueous medium comprising a mixed solution of salt, sugar, and acetic acid (vinegar) by means of the emulsifying agent, egg yolk. (The mustard is now known to exert emulsifying properties, also.) The high percentage of oil, present as drops in the dispersed phase, accounts for the high viscosity commonly exhibited by the product. A fruit flavor formula comprises:

Orange, lemon, or lime oil	16 oz.
Gum Arabic	10 oz.
Gum Tragacanth	3 oz.
Water	1 gal.

The gums, which are classic emulsifiers, are soaked until well hydrolyzed; the oil is added; and the mixture is homogenized by passage through a homogenizing valve under pressure or is passed through a colloid mill. The result is an oil-in-water emulsion of the citrus oil in water, stabilized by the gums.

In recent years, emulsion paints have been prominently exploited and have received appreciable acceptance by the public. While these may be of either water-in-oil or oil-in-water type, the latter or oil-in-water type only will be discussed here, as it has the greater current interest. These paints are marketed as pastes or concentrated emulsions, which are diluted with water before use. A typical formula for emulsion paint is as follows:

Ester Gum	93 parts
Bodied Linseed Oil	75 parts
Casein	42 parts
Oleic Acid	
Aqua Ammonia (28-29	
NH <sub>3</sub> )	16 parts
Mineral Spirits	93 parts
Pine Oil	32 parts
Liquid Drier	8 parts

Chlorinated Phenyl
Phenols 1 part
Water 604 parts

In this formula, casein (or ammonium caseinate, since sufficient ammonia is present) and the ammonium soap of oleic acid, produced in situ in the mixture, constitute the emulsifiers. They also serve as protective colloids for any pigment particles that may be incorporated later. (The properties of these materials can be recalled by reference to parts two and three of this article.) Ammonia soaps are water-soluble, but lose ammonia on exposure to the air. Therefore, the paint after application is not removable from the painted surface by the application of water, as it would be in some degree if a soap of a non-volatile base like caustic soda were used as the emulsifier. Bodied linseed oil and drier and mineral spirits will be recognized as common ingredients of ordinary oil paints. Ester gum is a resin produced by esterifying rosin acids with glycerol. Pine oil is added as an antifoamer, and the modified phenols act as preservatives for the casein, a protein material subject to decomposition. (In using preservatives in emulsions, it is important that their solubilities be considered, for a preservative which dissolves almost completely in the oil phase of an emulsion will probably not prevent bacterial action in the aqueous phase, and vice versa.) A certain furniture polish is said to comprise:

Mineral Oil						25%
Naphtha			,	,		10%
Stearic Acid						4%
Triethanolamine						2%
Water						

To prepare it, the stearic acid is melted, the naphtha and mineral oil are stirred in, the triethanolamine is dissolved in the water and warmed to about 140° F., and the aqueous solution is added to the oil mixture with stirring. Here, the emulsifying agent is triethanolamine stearate, produced in the above formulation procedure. Because the emulsifying agent is water-soluble rather than oilsoluble, the emulsion produced is of the oil-in-water type. The naphtha is merely a diluent and thinner for the mineral oil, which is the polishing agent. A soluble oil may be made from:

Mineral Oil ..... 80%

Petroleum Sulfonates ... 20%
The petroleum sulfonates used here are the so-called "mahogany soaps," oil-and-water-soluble petroleum sulfonic acids, usually in the form of sodium salts. The solution of petroleum sulfonates in mineral oil is so readily miscible with water that merely pouring it into water produces a milky emulsion. In this example, the procedure of general emulsification Procedure (3) above has been employed.

It may be noted that the foregoing examples have emphasized the oil-inwater type emulsion and ignored the water-in-oil type. This is true, because so many commercial emulsions are of the former type, and so few of the latter. Naturally, occurring petroleum emulsions are preponderantly water-in-oil, as are gas-tar emulsions. Other examples of this type occur, as, for example, cold cream in the cosmetic field. But in general, attention has always been focused principally on the oil-in-water type. (In the case of natural petroleum emulsions and gas-tar emulsions, practically all the attention paid them has been concentrated on their destruction or "breaking," rather than their formulation or stabilization.

In concluding this series of articles, the author wishes to express the hope that the information presented may be of some small value, and that the space devoted to its presentation has not been wastefully expended. He also wishes to acknowledge the kindness of Melvin DeGroote, his long-time friend and mentor, who contributed some of the ideas expressed and called attention to several rather egregious errors in the original manuscript.

#### Honduras Essential Oils

Honduras exported about 5,000 pounds of lemon-grass oil, and 1,200 pounds of citronella oil in April, 1944. Total shipments of citronella oil during 1944, through April, amounted to 4,400 pounds.

#### Guatemalan Coffee Exports

During the first four months of 1944 Guatemala exported 30% more coffee than in the corresponding period of 1943. The bulk of this export went to the United States.

#### Bamboo Into Paper

A new process has been reported whereby bamboo may be made into paper. Experiments have been carried out by the Herty Foundation in this country which indicate that a paper suitable for bags, wrapping and book binding may be produced. Whether this new product can compete with conventional pulp in price remains to be seen. Bamboo grows and matures rapidly, and may be planted on land otherwise unsuitable for agriculture. Current experiments are reported to be on a giant bamboo, which grows to a height of 65 feet.

#### Brazilian Titanium Oxide

Brazil is considering the establishment of titanium oxide facilities. The raw materials are available. Imports of titanium oxide amounted to \$675,000 in 1943.

#### Dominican Republic Cocoa

The summer harvest of cocoa has declined in the Dominican Republic by about 34 per cent under the 1943 season.

#### Hatian Coffee Crop

It is now believed that the current coffee crop of Haiti will amount to almost 25,000,000 kilograms (2.2046 pounds). This will represent the highest figure since the 1938-39 season.

#### Argentine Sugar Crop

Prospects are that the 1943-44 sugar crop of Argentina will be approximately 550,000 short tons. Annual domestic consumption is about 540,000 tons.

#### Nigeria Soft Drinks

Curtailment of soft drinks, caused by wartime restriction of imports, has resulted in a new industry in Nigeria. Two factories are now producing soft drinks from oranges, grapefruit, limes and lemons. One plant is located at Abeokuta, and the other at Agege. The latter is cooperative. Farmers of the district supply the fruit and manufacture the drinks. Flavor and quality are called good, and volume is increasing.



# Survey of Brazilian Mint Oil and Menthol

The growing of Mentha arvenis in Brazil . . . Climatic and soil conditions . . . Physico-chemical properties . . . Factors influencing the future production of mint oil

#### by DR. ERNEST GUENTHER

Chief Research Chemist, Fritzsche Brothers, Inc., New York, N. Y.

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PROBABLY introduced to Brazil by one of the numerous Japanese immigrants in the State of São Paulo, the cultivation of *Mentha arvensis* was first started during 1936, on the São Bartolomeu farm in Paraguacu. A quick growing plant, *Mentha arvensis* can easily be propagated and the planting acreage rapidly increased, whenever necessity warrants it. Originally controlled exclusively by Japanese growers and share croppers, the industry is now passing more and more into Brazilian hands.

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> Brazil's principal mint oil producing regions are today in the State of São Paulo and can very roughly

be divided into the following sections:

I. Those jungle lands thus far settled in the great triangle formed by the Rivers Paraná and Paranapanema, approximately near the upper section of the Sorocabana Railroad, with centers such as Presidente Prudente, Presidente Bernardes, Presidente Wenceslau, Santo Anastácio, Paraguacu, Regente Feijó, Alvarez Machado, Assis, California, Marilia, Bastos, Tupan, etc. On some of the older maps this region is still marked as unexplored, but lately many immigrants have settled there, burning down the jungles and

cultivating the land with all kinds of crops, among them mint.

II. The more southern, earlier and more densely settled section along the Sorocabana Railroad, with Ourinhos, Avaré, etc.

III. The section in the vicinity of São Paulo City with Cotia, Perus, etc.

IV. The new section in the Littoral, the low, tropical coast lands southwest of Santos. There the mint plant seems to grow very well as the hot and humid climate protects it against drying out. Therefore, the development of the leaves and the oil yield has been very good.

V. Many small sections scattered over the State of São Paulo which cannot be easily classified.

Altogether more than 3,500 alqueiras Paulistas (about 22,000 acres) have so far been planted with mint in the State of São Paulo, the acreage still being increased.

Soil and climate greatly influence the growth of the plant, the formation of oil and its composition (content of menthol). The plant seems to thrive well in the subtropical climate of São Paulo which, at altitudes from sea level up to 800 meters, ranges from an average maximum temperature of 30°C. to an average minimum temperature of O°C. It remains to be seen whether the plant exhausts itself quicker in the tropical, humid regions of the sea coast (Littoral), in the hot, lowlands along the Paraná River, or in the cooler regions around São Paulo City, for instance. In other words, it is still not known

whether a planting will survive there in the same soil for two, three, four or more years and yield every year the same quantity of leaf material and oil. It seems that in very hot, tropical lowlands the quality of the

oil is excellent.

According to experience gained so far, Mentha arvensis requires a soil of good quality; it prefers loose humus, rich in organic matter, such as occurs beneath freshly cut and burnt jungle or virgin forests. For this reason, the plantings have reached their greatest extent in the great triangle formed by the junction of the rivers Paraná and Paranapanema, about twenty-four hours by the Sorocabana Railroad from the City of São Paulo. Because of similar soil and climatic conditions, the plantings of mint are being extended all over that region. The soils there are of sandy structure, have been enriched with humus by virgin forests and jungles in the course of hundreds, if not thousands, of years. These soils remain remarkably fertile for about six to eight years, when the fertility declines rather rapidly by exhaustion of the humus through plantings, erosion and sunburn. In



Distillery in operation

those regions, the general practice is to plant corn, cotton and rice during the years of fertility and then to turn the exhausted land into pastures for cattle raising.

In clayey, compact and dry soil, the mint grows very small and gives an oil of inferior quality.

The growth of the plant and the yield of oil are greatly affected also by weather conditions—dry spells causing much damage, evenly distributed rainfalls benefiting the growth. Another unfavorable factor is lack of sunshine; plantings shaded during a good part of the day produce oils with a low menthol

content.

Mentha arvensis is being cultivated also in some of the older municipalities, i.e., in earlier settled places where the soil is already partly exhausted and only of medium fertility. In these regions, however, the plantings are located mainly in moist low-lands, rarely under irrigation, while on freshly cleared jungle soil even the hilltops can be planted with mint. Under these conditions, it becomes necessary to fertilize, usually with compost and nitrogen compounds.

Berzaghi¹ recommends the follow-

ing formula for one alqueire Paulista (5.9 acres):

40,000 kilos well soaked dung, incorporated into the soil

600 kilos Chile saltpeter

400 kilos potassium sulfate 200 kilos sodium chloride

The dung and the potassium sulfate should be applied in the fall; the saltpeter and sodium chloride separately during spring, and in every case at a time when the plants are dry.

As time goes on, mint will probably be planted mainly in newly opened regions, former jungle and virgin forest lands, the soil there being so fertile and conditions so favorable that competition becomes almost impossible. Furthermore, such plantings can be expanded at very little gost.

#### HARVESTING

In newly opened regions, no weeds need be feared, at least for the first few years after the virgin forests have been cut and the soil burned over.

Furthermore, it is unnessary and, because of the many felled logs even impossible, to prepare those lands by plowing, harrowing, etc. The early part of the rainy season beginning with spring, from the end of August to September in Brazil, offers the most opportune time for planting. Mentha arvensis is planted by laying runners at a distance of fifty centimeters all around into shallow furrows dug with a harrow; the holes are closed by tramping the earth down, and finally the planting is

The roots employed for propagation should be selected from the healthiest plants, preference being given to those only one to two years old. As they do not keep for a long time, they should be fresh, not dry and blackened. These roots are first cut into pieces five to six centimeters long with three to four knots and planted into the furrows. The root runners sprout after a short time and form small bushes which soon permit a first harvest. Afterwards the roots develop strongly, forming new

¹ Caetano Berzaghi, Cultura da Menta para Producao de Gleo e Mentól—a brochure edited by the Dept. Agr., State of São Paulo.

runners which close the plantings (meadow mint) and completely cover the soil. This coincides with the greatest harvest.

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After the plantation has produced a crop, it might be advisable to thin it out, leaving only twenty to twenty-five plants per square meter. Too close spacing does not permit sufficient air circulation or sunlight penetration and this frequently results in dropping of the lower leaves. For better sun exposure, the rows should be laid out in an east-westerly direction.

Under normal weather conditions, it is possible to cut the plants two to three times a year, these cuttings forming the total yearly harvest. In the case of newly established plantings, the second cutting yields the most herb, while in the case of two-year-old and older plantings the first cutting gives more plant material.

Some growers prefer to propagate with young plants taken from nursery beds, 1.0 to 1.5 meters wide and 20.0 meters long, and laid out like any vegetable bed in fresh soil, rich in organic matter. The beds are pre-pared in winter, June to August, so that the young plants are ready for transplanting in spring (September to October). The sowing of the nursery beds is also done with roots, as described above. For transplanting, the young plants are carefully pulled out when they reach a height of about ten to fifteen centimeters. Rainy or cloudy days, when the soil is very humid, should be chosen.

When planting mint on old, previously cultivated ground, the ground must first be prepared by plowing once or twice, by destroying any weeds through repeated disc and spike harrowing, and by fertilizing; then shallow furrows are dug, the runners laid in and covered with earth. The plantings must be completely free of weeds which, when distilled with the mint, impart a distinct off-odor to the oil. Young plantings can be weeded mechanically, but in older ones which are closed in (meadow mint) the work must be done by hand.

The second year coincides with the heaviest crop. Production falls off in the third and fourth years and weeds invade the field. It then becomes advisable to plow under and to rotate the crop. In certain districts with very humid soil, rotting

of the roots may necessitate early replanting.

Generally favorable factors for a high yield of oil and a high menthol content are a rich soil, ample and well-distributed rainfalls and exposure to sunlight.

The most appropriate time for harvesting is during the flowering period when the oil contains a maximum of menthol. In the case of older plantings, the first cutting takes place from December to the end of January, provided weather conditions are normal. Newly started plantings, on the other hand, can hardly be cut before the beginning of February. The second cutting may be made three months after the first, while the third and smallest cutting, which is often omitted altogether, takes place three months after the second. The second cutting yields the most plant material and the optimum of oil, which at that period contains the highest percentage of menthol and esters. This might be due to the fact that the temperature is relatively low in April and May.

On smooth ground the cutting can be done with scythes while on freshly cut forest and jungle soil, which has not been cleared of logs, sickles must be used. The freshly cut herb material is left to dry and cure in the fields, according to conditions for twelve to twenty-four hours, which seems to be the most economical way to prepare the material for distillation. Or the mint is tied into bundles, as in Japan, hung on racks in drying sheds, or stored loosely in open air on hard soil, and distilled as soon as the capacity of the stills permit. It seems that the yield of oil is higher from cured, semidried herb than from fully dried material.

#### DISTILLATION AND YIELD OF OIL

The art of distilling has spread rapidly in Brazil. Some of the field stills are small and quite primitive, others much larger and more advanced. A typical distillation post usually comprises two tanks, some made of wood, copper condensers and separate steam generators. The small stills are often heated with direct fire. The crude oil, which usually contains impurities, water and mucilaginous matter, is poured into former gasoline cans and, without filtration, sold to middlemen or field brokers.

Fully dried plant material yields almost two per cent of oil, semidried herb about 1.5 per cent. Distillation of one charge in primitive stills lasts about six hours, of which two hours are required to get steam up. Better stills complete the operation in less time. The average still holds about 450 kilos of fully dried material and yields about eight to nine kilos of oil; a charge of semidried herb weighs about 600 kilos and yields eight to nine kilos of oil. Wood serves as fuel. The exhausted plant material is thrown away, or sometimes used for fertilization.

#### YIELD OF OIL PER ACRE

On new soils and with three cuttings a year, one alqueire Paulista (5.9 acres) produces an optimum of about 20,000 kilos of fresh (green) leaf material or 200 kilos of oil. Exceptional yields up to 300 kilos of oil per alqueire have been reported on new soils of very rich black muck. About 180 kilos per alqueire were obtained in the hot and humid climate of the newly developed Littoral section during 1943-44. The yield is much lower on older lands, or on soils of lower fertility, or if the rainfalls in spring during the period of vegetation are irregular or badly distributed. The average yield of mint oil per alqueire in years of normal weather ranges from 120 to 150 kilos; it may be only half if droughts interfere with the development of the leaves.

#### MENTHOL CONTENT

The menthol content of the complete oil depends upon the time of cutting, also upon the prevailing weather. Exposure to sunlight seems to increase the yield of oil and its menthol content. Depending upon soil and weather conditions, the first cutting produces oils containing sixty-five to seventy-five per cent of menthol, the second cutting oils of about eighty-five per cent, the third cutting oils containing seventy to seventy-five per cent menthol. The average menthol content ranges from seventy-eight to eighty per cent for oils from the higher lands, and amounts to about eighty-seven per cent for oils from the warm and humid Littoral.

(Editor's Note: This article will be continued in an early issue.)

# The Gossiping

### Guide to the News

Alcohol available in France for the fine perfumes but not for the colognes . . . Sound promotion essential . . . Importance of trade paper advertising

by RAYMOND W. LYMAN

SHOPS everywhere have been so conscious of labor shortages that they haven't been demanding the usual services from the manufacturers. Shipments of goods delight them. A new leaflet is a thrill. But that time will soon be over.

One brilliant purchasing agent, reminded of old-time promotions, laughed—"We've had such a time just getting packages out that we've almost forgotten how to do a well-rounded promotion job."

That was anything but fair to herself, for she can always be counted on, even in wartime, for constructive ideas for her firm. The interview did make me look around, however, to see who was doing an outstanding job in presentation. Publicity, advertising, windows, counter-appeal—all knit into one. Backing nice packages, containing a satisfactory product. (Whew, what an amount of work such dovetailing means!)

Our laurel wreath this month goes to Miss Miriam Gibson of Shulton, Inc. Store windows and counters are tied into the national ad timing. Counter cards; leaflets for statement enclosures, counter and package insertion uses; perfume blotters for statement use or counter reminders; tester racks of the four Leigh perfumes for customer trial use. Appealing packages of the four perfumes themselves, each design carrying out the idea of the perfume.

That, gentlemen, is a well-rounded promotion. Miss Gibson will have to share a corner of her wreath with Mr. Schulz. A president is merely the man who does the worrying but is exceptional when he allows his executives full play in their own departments. (The advertising agency gets none of this credit, for it is lucky to have an account which follows through so completely!) Felicitations on your recent marriage, Miss Gibson.

#### A WORD TO THE WISE

You'd better begin to build better buyer relations again. And reeducate on store promotion and advertising simultaneously!

#### GLASS

Waiting for the whistle is a hard job for those like the Kimble Glass Company. The fine moulded bottles will be a wonderful sight again on shelves. And they have new processes and ideas to come which they have been hoarding during this wartime. The ones I have seen are so lovely that no one will ever be willing to throw a bottle away.

Slogan: Incidentally, their slogan is a superb one for the entire toiletries trade. The Visible Guarantee of Invisible Quality. That's a humdinger.

#### FRENCH PERFUMES

Enough alcohol is available in France for the fine perfumes, but not for the colognes. Shopping for bottles in which to ship is the bottleneck. Shortly, our friends will be here. How glad we will be to see them.



Perfume Testing Pack

But that brings to mind the danger of our scanty advertising and promotion due to the lack of paper. The French will get millions of dollars of free publicity when they arrive, Like the champagne and brandy representatives, they will exude romance and quality from every pore. Subtly, oh very subtly, the idea will be conveyed that no domestic product can be as perfect as the superb French product.

So—the moral is simple. Get going right now on the best integrated campaign you have ever launched. Expand your advertising, publicity, consolidate your buyer relations. Do better trade-paper advertising. Educate your store salespeople to din quality into the customers' ears. . . .

#### CHRISTMAS PACKAGES

Superb for wartime, aren't they? Uncle Sam, or I should say Secretary Morgenthau, should be profoundly grateful to the Toiletries' purchasing agents who have slaved eighteen hours a day to make these packages possible. The mental lift which comes from color, the physical rest which comes to a tired housewife or war-worker or the women in the Services, is well attested. What about some certificates for meritorious service rendered, Mr. Secretary?

#### TRAVELLER

One of my favorite gadabouts is Miss Dorothy Nichols of Primrose House. Having come up from the ranks herself, she finds out quickly and easily what the current local situation is. No mere report checker, she, but an invaluable asset to her firm.

The hand lotions, rich in lanolin, which I've preached so long—are going like wildfire. Soon there will be several heavy creams for the face. Isn't is wonderful to plan constructive new items for a line again? Miss Nichols' enthusiasm is contagious.

In Norfolk the foreign sailors line up at cosmetic counters for quantities of lipstick and powders. An all-



French Perfumes

purpose cream for cleansing and foundation is all you could expect the boys to bother with. But they never forget a bottle of hand lotion. Apparently, the hands must be soft, the lips delicately outlined-in any country. Often the sailor hauls a list from his pocket which has obviously been compiled by the women who will receive the merchandise. Pure, bright reds-no orange or blue notes. The powder a rose rachel. The women are apparently slightly dark of complexion but don't want to look muddy. rouge is specified a pure, bright red.

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This has always been true basically, hasn't it? And it's interesting to note that toiletries the world over has a customer job of educating to a better care of the skin. Not just one dab, a whisk of powder and a smear of lipstick and rouge.

And here's a bit of welcome to Miss Laura Josephson, of the beautiful skin, in the Southwest territory. Her sure knowledge must be a pleasure to Miss Nichols. (Isn't it odd how travelling representatives of toiletry houses always have nice skins and convincing sales personalities? I wonder what effect a sallow-faced wren with blotches would have on the customers?)

#### ADVERTISING DEPARTMENT NOTE

Now that heavy orders are rolling in, what about some good tradepaper advertising addressed to the buyers, and advertising departments of stores, drug stores, etc.? So many bad practices have developed in this wartime, that only by addressing the trade directly are you going to correct them. Big ads aren't necessary. But I should definitely like to see current problems discussed. In my opinion, there is no excuse for the usual slovenly trade-paper ad which is merely a reprint of a national magazine ad.

And I'd also like to see constructive ads written for the teen-agers. (You remember Miss Minnie Moore, southern Ohio representative of Avon products, reported that boys as



Good Trade Ads

well as girls had asked many questions when she—a former school superintendent—had been asked to talk to the youngsters on cosmetics.) These youngsters have to be taught how to apply and what to apply so they won't look like freaks. They are also much interested in what goes into the products—you're addressing students of Beginning Chemistry, don't forget. Here comes a batch of prospective customers. Let's cultivate them!

#### OIL SUPPLIERS

That panting sound you hear is the supply houses hoping against hope that some of the reports of shipments are true. Next month they promise definite news. Now they all talk pessimistically. But oh, how they're hoping!

#### HERE AND THERE

In Birmingham—Loveman's beautiful store. Fine merchandising, good display. Their simple ads—"You'll enjoy shopping at Loveman's."



Christmas Shoppers

Odum Bowers and White get a special pat for their insistence that their buyers order early. But "The Store That Quality Built" will not allow wartime goods dumped there. With huge Christmas buying orders ahead. the trade MUST see to it that no inferior goods are worked off ANY-WHERE. Don't forget you're building future customers. Junk any item you're not satisfied with. Don't monkey with your future. Some of these new houses will give you stiff competition for a while but many accept shoddy. If you refuse to, and raise your standards ever higher, a year or two will see them done and you more firmly entrenched with your customers. Preach and advertise quality.

#### AD OF THE MONTH

Avon Products has executed a fine ad with lots of white space, good copy, good sweep of color. Reminding citizens of our early pioneer days and the making of a sturdy country is good public relations. The people



**New Products** 

who read this ad will be glad to see the Avon representative call to make them more beautiful. So—a bouquet to everyone who had a hand in this ad. . . .

#### NEW PRODUCTS

Miss Neva Bradley of Daggett and Ramsdell is weighing what new product can be added to the line next spring as well as getting together the packaging necessities and counter cards for the spring "cleaning" drive. Her far-sighted, indefatigable work is the reason Daggett and Ramsdell will continue to grow in their careful way. She threw out an item entirely, during this wartime scarcity and delivery of not quite as good as specified, rather than deliver an inferior item. She didn't expect that to leak out. But when it did, don't you suppose her customers were pleased as punch? (You can't keep a secret in this business. The supplier in question told on himself and said he'll never again try to market something which hasn't been thoroughly tested-no matter how long it takes to do it. It's no wonder the suppliers have gray hairs!)

#### LONG-RANGE VIEW

Sales manager Harold Proskey of Lehn and Fink has a twofold answer for next year's problems. As cutbacks occur in the war production, he doesn't expect people to splurge but to hang onto their savings until they know just how many in the family are going to be employed and just what the budget is going to be. The cosmetic people will be least affected of all industries, he believes. (That doesn't mean lavish additions to lines, however, or a standing still on the present items. Fill in a treatment line as you can. Introduce a new item, when it's fully ready and tried and promoted, but don't add an item just because another firm has.)

He expects the expensive goods to hold their own at pre-war customer levels but not to show the percentage of increase of unusual months this year. (Refugee and soldier buying, plush war-worker purchases must be discarded for normal outlooks. A percentage of war-workers, however, will gradually increase the higher-bracket purchasers having a taste for fine quality which will not be satisfied with anything else. Promotion and advertising, more intelligent store presentation are the deciding factors here.)

But the bulk of the buying will be according to pocketbook as it always has in this great country of ours. So Mr. Proskey is enlarging and training more salesmen to widen his postwar territory appeal.



Window Displays

You can't beat American businessmen for constructive work, can you? The award of the month for creative thinking goes to Mr. Proskey!

#### GOOD WINDOWS

Jordan Marsh, Boston; Kresge of Newark (for the Lenthéric work); Julius Garfinckel & Co., Washington, D. C.; Blum's, in Chicago, and the remarkable Bonwit Teller work with Charbert's new Fabulous as well as their ad approach. Swell teamwork—buyers, houses and the entire store personnel of advertising, promotion and window display. That's what we're going to have to do after the war. Complete, careful work. So a bouquet to Kresge and a huge one to B. T. . . .

#### BEST PROMOTION

When it finally comes time to get a product off, a lot of houses are tired of the work involved. So much drudgery goes into producing a completed job, such as the new Rocket Red lipstick and Rouge packaged for the U. S. Cadet Nurse Corps—by Lenthéric, that the firm says "Get the publicity out fast" and a slipshod job is done for the final press releases. That's no time to let down.

The fine job done by Miss Jill Jesse rates a special bouquet this month. In her letter, headed by the symbol of the corps, she has cleverly matched the bright pure red of the lipstick. The package is described,

combining the gray of the uniform with the red of their sleeve patch. The background history of the symbol is given as is the size of the corps and its recruiting necessity, age, scholarship, expense, where to apply for enlistment, all are given. This is one letter which will get into newspapers nearly "as is" and I'll wager that the package will make a number of youngsters think seriously about the corps. Fine public relations, Miss Jesse!

#### WARNING

Of necessity I've had to see a lot of the country this past two months. People everywhere are eager for merchandise, anxious for the war to be over. But everywhere they want the best quality they can buy—prewar quality, not quantity.

A number of manufacturers are thinking of huge markets in terms of quantity and cut-throat competition. Too many government bureaus are thinking in terms of quantity. The toiletries manufacturers have built their fine businesses over many years on quality. The public will not accept anything else. If you want to stay in business—quality, quality, quality is the only story you can preach. Put it on the walls. Use it for the one slogan to din into the ears of your salespeople, your purchasing department.

Yours for business five years from now. Good luck when you shoot for the moon. . . .

#### Technical Abstracts

Method of Stimulating Plants. Re. 22,420. It is often desirable to stimulate the growth of plants which have been transplanted. Large losses are often experienced in transporting tomato and other seedlings from southern growers to northern points. The patent describes a method of treating plant roots and tubers which greatly cuts down losses in transplanting and, in many cases, stimulates the growth of plants.

Tomato plants may be packed in bundles and the roots wrapped in peat moss wet with a polyhydric alcohol solution. The concentration range may vary from 0.1 to 10 per cent, and the alcohols found effective include glycerol, sorbitol, diethylene glycol and propylene glycol.

The roots of pepper, sweet potato,

broccoli, and other vegetable plants, as well as fruit trees, roses, or almost any other plant subject to transplanting, may be benefited. Treatment may be applied to the roots directly instead of wetting the peat moss.

Glycerine-treated tubers such as potatoes, if soaked in the solution just before planting, are found to give appreciably higher yields.

Since concentrations as low as 0.1 per cent were found to be effective, the stimulation is not believed due to the water-absorbing properties of the liquids used.

Preparation of Glycerol Ointment. Norbert Schniderschitsch. Scientia Pharm. 13, 39-40, 1942; Chem. Zentr. 1943, I, 183. When this ointment is prepared at 100-110° a transparent jelly is obtained. If the ointment is prepared on the water bath, a nontransparent product is obtained which rubs better into the skin. The addition of tylose produces a product which is grainy, with poor appearance and consistency. The addition of tragacanth increases the stability of the product and tylose does not. The ointment containing tragacanth takes up oils poorly but promotes the incorporation of anthrasol. (Through C. A. 38, 3415, 1944.)

Relationship of Particle Size and Other Properties of Dentifrice Ingredients to Toothbrush-Abrasion of Enamel. Sidney Epstein and M. L. Tainter. J. Dental Research 22, 335-44, 1943; C. A. 37, 6087. The median particle size of the powder is highly reliable in predicting abrasion. "The best measure for comparing the abrasive power of different chemical materials is to compare the slope of the curves relating their median particle size to determined abrasion. Comparison of the relative abrasiveness of any 2 such powders, even at the same particle size, will give ratios which will not hold for any other size particle, unless the curves happen to be parallel." Acid calcium phospate is about 1/6 as abrasive as precipitated chalk. Apparently the Moh hardness number gives little information as to prospective abrasion of enamel by compounds softer than enamel. Pumice and silica, with Moh hardness number higher than enamel, are highly abra-(Through C. A. 38, 3090, sive. 1944.)

# Permanent Waving—Old and New

by MAISON G. DENAVARRE

Technical Editor of the American Perfumer & Essential Oil Review and of Elaboraciones y Envases, Special Lecturer in Cosmetics, Wayne University, College of Pharmacy, Consulting Chemist, Member Recipe Book Committee and Board of Experts of the American Pharmaceutical Association.

Author's Comment: Essentially, the hypotheses upon which the following address is based are those of Astbury and Speakman.

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The phenomenon of permanent set is not clearly understood, especially from the view of hair waving. While Speakman believes that RSOH groups are essential to permanent set, other scientific workers claim this point to be debatable. All workers agree that the disulfide linkage of cystine must be broken, but whether one or the other products resulting from the rupture of this group aid or abet permanent set is neither definitely established nor unanimously accepted.

Those practicing the art know that the hand of wool, or the "quality" or "feel" of human hair after treatment with thioglycollates is considerably better than after treatment with alkalis or sulfites. In addition, the hair also seems to rewave satisfactorily with thioglycollates regardless of the number of times the wave is given, providing (a) the alkalinity is carefully controlled, (b) that reduction is caused to stop at the proper times and (c) that the products of reduction are oxidized with a suitable oxidizing rinse.

Only thioglycollates and certain mercaptans give a sharp and selective cleavage of the disulfide group of cystine, more so than any other common reagents. On the basis of this theory, it is possible that superior results from the use of thioglycollates may be achieved if the wave is properly exe-

Accordingly, it is therefore possible to reason that thioglycollates are the superior waving reagents as compared to alkali solutions of sulfites if the theories used in the following article are discarded. What seems to be a truth on paper, sometimes turns out to be a fallacy in fact. The author has preferred to use the Astbury and Speakman hypotheses for permanent set, although others may not agree.

how much of what to use. Eventually. Nessler was able to determine the required alkali strength from the elasticity of hair. The more elastic the hair, the weaker the alkali re-quired. Ten different degrees of elasticity were adopted with alkalinity going from 1 to 10 per cent in the strongest solution. Most solutions contained from 5 to 10 per cent

Many of these solutions remained the same to around 1938 or 1940 when the influx of chemical heating pads required an adjustment of waving strength. An analysis performed in 1940 disclosed 8 well-known brands as not having adopted the use of sulfites, relying entirely on alkalis for waving strength.

It was about that time that the first so-called cold wave made its debut. Everyone knows by now that the first cold wave solution contained ammonium hydrosulfide, but it is not commonly known that the death ascribed to this cold permanent waving solution was due more to the greater toxicity of ammonium hydrosulfide than to hydrogen sulfide, one of the products of hydrolysis.

Experiments by Laug and Draize,1 published after the unfortunate incident, proved that "poisoning from ammonium hydrogen sulfide occurs more rapidly than from hydrogen sulfide when these compounds are in contact with the skin." Exposure to either produces sulfhemoglobin with hydrogen sulfide being present in the expired air.

With the seizure of ammonium hydrogen sulfide solutions, cold permanent waving suffered a setback, but not for long. The organic sulfur containing compounds were brought to the fore in the shape of thioglycollic acid derivatives. (Glycollic acid is alpha-hydroacetic acid; thioglycollic acid contains sulfur in place

Hair waving is as old as mankind: only the method of producing the wave has changed.

While hair may be waved by:

- 1) using a finger waving fluid, or
- 2) with curlers, or
- 3) by means of a marcel iron, or
- 4) by permanent waving, so-called, all of the methods are founded on the fact that to wave hair, preformation and sulfur loss are necessary to ef-

fect the wave. Along with loss of sulfur from hair is loss of nitrogen as ammonia, the loss increasing as the alkalinity becomes greater.

These are the fundamentals upon which all methods of hair waving are based. The only difference being that more is known about it today than when Nessler invented the modern permanent wave in 1905.

In Nessler's time, the hydrolyzing agents used were all alkaline materials. In fact, it was a guess as to

[Presented before the Beauty and Bar-ber Supply Institute, Inc., Palmer Hotel, Chicago, Ill., September 12, 1944.]

of the oxygen in the alpha hydroxyl group of glycollic acid.) Thioglycollates had been used in depilatories with good results. In fact, they are less smelly than the inorganic sulfides and hydrosulfides. So it was natural to look to thioglycollates as possible hair waving ingredients, since the only difference between hair waving and depilation is a matter of degree.

Today, almost all of the cold permanent waving solutions contain thioglycollates as active ingredients. In addition to thioglycollates, at least one other thio compound has also been used.

In attempting to evaluate both hot and cold methods of permanent waving, I will not hesitate to confess that some of the conclusions drawn have not as yet been substantiated by experimental evidence. Yet one must have a theory before it can be proven.

#### EARLY PATENTS

Hair waving drifted along aimlessly for years; from time to time a sporadic invention made its appearance. Proof of the lack of true hair knowledge can be quickly found in a study of the early patents on the subject. Every now and then a patent was granted on some ingenious revelation. The inventor was probably unaware of the potential value of his discovery, yet there are indications of expectation of the most modern practice in hair waving in these earlier patents. Thus Ingrassia's patent applied for in 1922 (U.S. Pat. No. 1,581,577) describes the use of sodium thiosulfate with borax and mineral oil, wetted into a paste, formed into blocks to be positioned on the pads used in hair waving. Still it was not until the early 1930's that sulfur compounds in the form of sulfites began to be used to put greater waving strength in a solution.

In 1926, Brown applied for a patent (U. S. Pat. No. 1,681,170) covering a composition for treating hair that consisted of keratin dissolved in ammonia water. While Brown's idea was to wave hair and to redeposit keratin on the hair so waved, he did not realize that he was actually taking advantage of the sulfur capacity of keratin to effect a better permanent wave. In fact, the older such a solution is, the better it seems to work. Not until 1936 did he realize

that hair waving at room temperature could be achieved with a water soluble sulfite.

Steinbach in 1932 was one of the first to conceive the use of sulfites to get better waving of hair. In his U. S. Pat. No. 2,095,374, he describes a mixture of 70 per cent K<sub>2</sub>SO<sub>3</sub> and 30 per cent (NH<sub>4</sub>)<sub>2</sub>CO<sub>3</sub> as the ratio of the two substances to give a neutral solution. Yet we all know that sulfites work in solutions of a wide pH range.

In 1933, Maeder applied for patents (B. P. No. 435,213 and U. S. No. 2,068,809) for a method of permanent waving of hair with a solution of sulfide not in excess of 6 per cent and at a temperature of from 65 deg. C. to 100 deg. C. He couldn't have been sure of himself or he would have stated that the hair was to be loosely wound, without strain and that it was necessary to arrest the action of the sulfide or depilation might take place. In fact, it is doubtful if a safe permanent wave can be accomplished by use of Maeder's disclosures.

In 1934, Speakman applied for British Patent No. 453,559, describing the use of a solution of metal sulfide, hydrosulfide, polysulfide or of hydrogen sulfide as the sulfur containing compound. His idea was to remove metallic substances from hair that interfered with the hair wave, but to perform the wave at about 100 deg. C., the temperature commonly used. Speakman already knew that these strong reducing agents would destroy hair if stress were used in winding it—a main difference between cold and hot waving-but he failed in his conception of hair waving for he could have effected a cold wave as readily as a hot wave, and he did not have to remove any metallic contaminants of hair to do it.

German Pat. No. 127,663 mentions a composition consisting of 3 per cent sodium sulfide along with ammonia and other ingredients. British Pat. No. 449,073 attempted to produce a permanent wave with less heat by using certain activators such as ammonium oxalate. Frederics and Brown in 1935 mention ammonium hydroxide and an alkali metal sulfite in U. S. Pat. No. 2,126,375. In 1936 Brown in U. S. Pat. No. 2,155,178 utilized ammonium sulfite solutions at temperatures below 50 deg. C. for from 3 to 6 hours.

In U. S. Pat. No. 2,056,358, Malone softened hair with alkalis, then digested the same with enzymes such as trypsin. This process is pregnant with impracticability.

While attempting to achieve a permanent wave with longer lasting properties, in less time and at lower temperatures, it was also apparently noticed that the more effective the solution, the greater the destruction of keratin both in hair and of hands, Accordingly, Pollock for Coriolan in British Patent No. 468,845 utilized a lotion with acid reaction, the active ingredients consisting of bisulfites and their addition products with aldehydes and ketones along with alum, adipic acid or acid lactates. Still other patents utilized acid or nearly neutral reacting ingredients.

Evans & McDonough in British Patent No. 428,952 attempted to make a better permanent wave by using a wetting agent, thereby insuring the production of a uniform wave on heating. The solution consisted of 4 per cent ammonium hydroxide, 1 per cent sodium alkyl naphthalene sulfonate or abietiene sulfonate plus or minus 1 per cent hexahydrocresol

or terpineol.

These are only a few of many patents granted. I am skeptical of the ability of many of these patents to withstand a court contest. For example, Brown was granted U. S. Pat. No. 1,681,170 in 1928 describing a composition containing:

Keratin 1 gra
Ammonia Water
(26 deg.) 10 cc
Water to make 100 cc

The claims sum up to a solution of the aforementioned composition for the purpose of permanent waving hair at a temperature of 100 deg. C.

Still in 1937, the U. S. Patent Office granted Maeder a patent on substantially the same thing, namely, a solution of keratin in stronger ammonia water to which a little alcohol was added. The addition of alcohol certainly added nothing new and does not comprise an invention. The keratin and ammonia without alcohol work satisfactorily. Alcohol alone will not work. So, Brown had the lock and key to the door while Maeder simply painted it another color.

In addition, Speakman, early in 1933 published information establishing the ability of ethyl alcohol to carry impermeable substances into the contex of the hair. His experiments undoubtedly antedated their publication. Where then is the required novelty in this disclosure?

There are unquestionably other cases of the same kind. It is likely for this reason that few cases of infringement actually go to court.

#### HOW DOES HAIR WAVE?

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Any attempt to interpret the transformations taking place in the keratin of hair during permanent waving of hair must first acknowledge the brilliant work of Astbury, Speakman and Harris, to name only a few of the scientists who have studied the keratin molecule, its possible configuration, composition and the things that can affect it. It is this work that makes it possible to study the technical aspects of hair waving.

I doubt if anyone can say that permanent waving may be explained by any one or two chemical reactions, although it is a pretty well established fact that permanent waving involves a reduction of the disulfide linkage of keratin (cystine) with a simultaneous hydrolysis of other linkages to a greater or lesser degree, especially if the solution is alkaline.

Harris puts it right to the point when he says that "unfortunately since many of the processes known to affect disulfide linkages (such as the action of light, alkalis, oxidizing and reducing agents) involves side reactions with other groups in the protein . . . conclusions based on their use may be open to criticism."

Speakman nevertheless believes that hair waving may be summed up by two chemical reactions.

- (1) R-S-S-R+ $H_2O \rightarrow R$ -SH+ R-S-OH
- (2) R-S-OH+RNH<sub>2</sub> $\rightarrow$ R-S-NH-R+ H<sub>2</sub>O

Cystine is first hydrolyzed as by water or alkali to form a sulfhydryl compound and a sulfenic acid. The sulfenic acid then recombines with amino groups to form new linkages.

Reducing agents act on the disulfide to form sulfhydryl compounds cysteine sulfonic acid, polysulfides, sulfides, thiosulfates and sulfites among others, depending on the reducing agent used, the conditions under which it was used, and whether its action was arrested by neutralization or oxidation.

It is important to know the reaction

products because it is believed that permanent set is dependent upon the formation of R-S-OH (sulfenic acid) groups. No such groups are formed for instance in thioglycollate reduction of hair, equation (3). Sulfites form a cysteine sulfonic acid that can build new bonds as easily as the sulfenic acid, or it may be hydrolyzed to sulfenic acid by alkali or water, equations 4, 5 and 6:

(3) 2HS-CH<sub>2</sub>COOH+R-S-SR→ 2R-SH+(S-CH<sub>2</sub>-COOH)<sub>2</sub>

- (4)  $Na_2SO_3+R-S-S-R\rightarrow R-S-Na+R-S-S-O_3$
- (5) R-S-SO<sub>3</sub>+NH<sub>2</sub>R $\rightarrow$ R-S-NH-R+ H<sub>2</sub>SO<sub>3</sub> or
- (6) R-S-SO<sub>3</sub>+HOH→R-S-OH and other compounds.

In a solution containing sulfite and alkali it is obvious that there exists pretty close to an ideal mixture for the purpose of producing the maximum number of groups capable of giving a permanent set to the hair. In an attempt to increase this number of new linkages, an oxidizing rinse may oxidize some of the sulfhydryl (R-SH) groups to disulfide groups, besides arresting the action of the reducing agent. An acid rinse on the other hand acts only to remove mechanically held or excess alkali and sulfite from the hair.

In thioglycollate waving, the arresting solution is used for two purposes, first to stop the reduction of cystine linkages (R-S-S-R) in hair by action on the thioglycollate rendering it inactive and second to attempt to oxidize some of the sulfhydryl (R-SH) groups to sulfenic acid and disulfide (-S-S-) thereby giving the hair somewhat more of a permanent set. Nevertheless, this re-oxidized compound does not reproduce the original stability of the hair keratin

On the basis of the aforementioned data one can hazard the guess that thioglycollate waving may produce more unseen damage within the hair than do the accepted solutions for hair waving, using heat. Similarly, hair waved by thioglycollate should not rewave as readily with standard solutions and methods as hair that has never been waved by thioglycollate. By the same assumption, several thioglycollate waves might so alter the hair as to render it impossible to wave, yet not change its outward appearance appreciably.

Realizing all these things, Speak-

man in his U. S. Pat. No. 2,261,094 has devised a "Method of permanently waving hair which comprises treating the hair for a period not exceeding 30 minutes with a solution of a reducing agent at a temperature appreciably below the boiling point and in the absence of amphoteric metals to effect reduction and disruption of the disulphide or cystine bond of keratin of the hair with the formation of sulhydryl groups and thereafter treating the hair while maintaining it in a curled or waved condition with a solution of at least one polyvalent metal compound whereby to form sulfur bonds containing a polyvalent metal in the hair molecules while the hair is in the curled or waved condition." Speakman produces as many sulfhydryl groups (R-SH) as possible by using an excess of reducing agent, then treats the hair with a bivalent metal salt such as of barium, copper and nickel among others, or an organic compound such as phosgene, to form a new sulfur bond (-S-metal-S-). Speakman suspected the formation of some such bond at least as early as 1934.

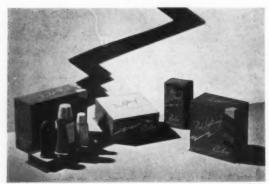
#### ANOTHER POSSIBLE LINKAGE

In the case of wool, it has been found that one-half of the sulfur is quickly lost on treatment with alkali alone; the wool then becomes very resistant to alkali. There is evidence of the formation of a linkage such as Carbon-Sulfur-Carbon, which is very stable to alkali.

Marriott<sup>2</sup> believes that not all of the sulfur of keratin is present as cystine but that part of it is present as a polysulfide which allows one of two tetravalent sulfur atoms present to behave differently, splitting off in alkali, leaving a Carbon-Sulfur-Carbon linkage.

Support for this C-S-C linkage exists in the experiments of Mizell and Harris³ which confirm the reaction proposed by Nicolet and Shinn,⁴ that lanthionine is formed from the product of hydrolysis of cystine and dehydroalanine. The latter explanation fulfills the requirements for linkage rebuilding, high strength of the fiber and low alkali solubility of alkali-treated fiber. As a result, permanent set in alkali-treated fibers such as hair may result in part from the formation of lan-

# Packaging



REVLON

CUTEX



REVLON: Another new color idea keyed to fall and winter fashions is created by Revlon. "Pink Lightning" lipstick and intense "Pink Lightning" nail enamel are two different shadings of vivid fuschia, yet both in the same color family. To complete the picture there is also a Pink Lightning shade in the Wind-Milled face powder.

CUTEX: Although a strictly wartime manicure case, its tricky tuck-in flap fastens as neatly as any metal clasp of prewar days. The case comes in leather as well as in printed fabric. It contains a deep polish shade, three preparations, cotton, orangewood stick, emery boards and a nail white pencil.

PARFUM L'ORLE: A new type of deodorant is created by L'Orle. Unlike other under-arm deodorants "Lor-odo" comes in a handy, solid bar, which is applied directly, avoiding fingernail mess. It is said to be non-irritating, non-greasy and can be used right after shaving.

PILCHER: A new streamlined amber shell lucite compact of sturdy construction. This smartly-styled case of translucent lucite is 3¾ inches round in diameter having a spacious interior. It is fitted with an attractive powder puff and bevel edged mirror.

PARFUM L'ORLE



PILCHER



SPORTSMAN PRODUCTS



The American Perfumer

52 October, 1944



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LENTHÉRIC

MARIA DANICA

PRIMROSE HOUSE

SPORTSMAN PRODUCTS: The new gift set for men consists of shaving soap, talcum and shaving lotion. The new shaving bowl of water-green ceramic has a sculptured bass on top. Talc is in a matching green container decorated with a Mallard Duck. Shaving lotion has a sail-fish painting reproduced in full color on the bottle.

MARIA DANICA: Featherfleck, a super-jumbo size lipstick and cream rouge is presented in four new shades—Wakening, Peony Pink, Vibrant and Amazon. Featherfleck cream rouge spreads smoothly, has lasting qualities giving a natural tint to the skin. The case is conveniently flat with a firm closure.

LENTHÉRIC: In honor of the U. S. Cadet Nurse Corps which has officially chosen "Rocket Red" lipstick and rouge as the perfect match to the bright red trim of their uniform, Lenthéric presents both these items in a striking package. Both the lipstick and cream rouge come in gray plastic containers with a red Maltese cross motif. They are packaged in a red lined, gray box.

PRIMROSE HOUSE: A practical and compact case of genuine top-grain saddle leather, with hand-turned edges and a standard zipper. It contains generous sizes of Chiffon beauty preparations. The case is waterproof, having a separate, roomy pocket for odds and ends.

ANTOINE: To complement the blue-reds and purples for fall, Antoine has designed a new make-up group called "Pink Riot." This group includes powder and rouge; a pinky cake foundation that is not drying; mysterious blue eye shadow and lipstick in a deep magenta shade.

MARIE EARLE: An overnight kit zipped across the top under its carpet bag handles and lined with water-repellent fabric. Inside the "Scotch Bag" are beauty traveling essentials—Marie Earle's Essential Cream, Soothing Freshener Lotion, Liquid Foundation, face powder, rouge and lipstick in plastic containers.

ANTOINE

MARIE EARLE





& Essential Oil Review

(Continued from page 51)

thionine, a possibility mentioned by Speakman & Whewall<sup>5</sup> who also suggested the formation of a C-S-C linkage under the same conditions.

This may be a partial explanation of the difficulties encountered in the early days in the use of a straight alkaline waving solution. Such hair would have been classified as abused, hard to wave, etc., and any wave given the owner of such hair would be done so with the understanding that the wave might not last as long as expected.

#### HOT AND COLD METHODS

In the older method of using straight alkaline solutions with electric heaters, a wave could be effected. Overheating or/and using too strong solution resulted in damage to the hair, which damage was never really repaired until the hair grew out, but could be so patched up as to give the hair a semblance of normalcy for a lapse of a sufficient length of time for new hair to replace the old damaged hair. When properly practiced, the old method showed only slight reduction of hair cystine, the main action probably being on the salt linkages.

Since the danger from overheating was sufficiently great to be a real worry, chemical heating pads were developed. They removed the hazard by heating to a predetermined temperature and no higher, the heat lasting for a fairly well established length of time, usually about 6 or 7 minutes.

However, the chemical heating pad lacked both the flexibility and heating capacity of electric heaters and hence pepper-uppers had to be added to the solutions. These turned out to be sulfites. Waving of hair now proceeded to be duck soup, until the bogey of humidity practically bankrupted the heating pad makers. Everyone remembers the episode well. In due course that was solved. So, everyone now looked to a method capable of producing a wave without the use of heat. That brought in stronger reducing agents with closely controlled alkalinity. The current favorite being a thioglycollate. In other words, the less heat used, the more and stronger the reducing agent needed. That is, for professional waving where time is an element.

In the rush for novelty, it appears to me that some of the long-known

fundamentals have been overlooked. Alpha thio substituted aliphatic compounds have the capacity to be irritants and sensitizers. They have pretty well established this property in use. So long as the operator is the victim, all is well, for with her it is a case of an industrial hazard. She must wear rubber gloves as part of a protective regimen. But the thioglycollate home waving solutions that are coming out are the real threat. The housewives, office girls and other users are consumers, not operators. and any risk they are exposed to is now a matter within the jurisdiction of the Food and Drug Administration . . . it must take action against any peril to consumers. Such action naturally affects the whole beauty industry. That such sensitization or acquired hypersensitivity from the use of thioglycollate solutions may occur is already an established fact. But fortunately, the only published report<sup>6</sup> so far deals with a case whose hair was waved in the beauty shop. Had the injury been suffered by a consumer at her own hands, the F. D. A. would have had to take appropriate steps to protect all other

Will thioglycollates last as waving ingredients? I doubt it. At least one cold wave method doesn't use them and is reported to be waving all right.

#### CONCLUSION

Is cold waving here to stay? There is but one answer to that. There is no such thing as cold waving. Socalled cold waving is waving without the use of externally applied heat. although some methods advise sitting under a heated drier. So, if you mean waving without externally applied heat when you say cold waving, I believe that a method of waving hair will be in vogue-and successful, that will not use the high temperatures of 100 to 120 deg. C. commonly used heretofore. The present waves are merely a stepping stone to a better waving method.

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<sup>2</sup> R. H. Mariott, Stiasny Fetsch, p-245, 1937. <sup>3</sup> L. R. Mizell and M. Harris, Nature of the Reaction of Wool with Alkali, *J. Research*, Nat. Bureau Stand. **30**, 47, 1943.

<sup>4</sup> B. H. Nicolet and L. A. Shinn, Abstracts 103d Mtg. Am. Chem. Soc.

April 1942.

<sup>5</sup>J. B. Speakman and C. S. Whewell, J. Soc. Dyers & Colourists 52, 380, 1936.

<sup>6</sup> J. B. Howell, Arch. Dermatol. Syphilol. **49**, 432, 1944.

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#### **Indian Paper Supply Short**

Approximately 79,000 tons of paper will be available in India during the current fiscal year. It is estimated that 30,000 tons will be available to the public, as compared to a normal peace-time consumption of 110,000 tons.

#### Copra from Ceylon

During the first half of 1944 the copra exports from Ceylon were considerably below those of a like period in 1943. It is estimated that 100,000 long tons of coconuts will be available for the production of copra and coconut-oil products during this year. An effort is being made to increase the output of copra.

#### Oil Exports from Ceylon

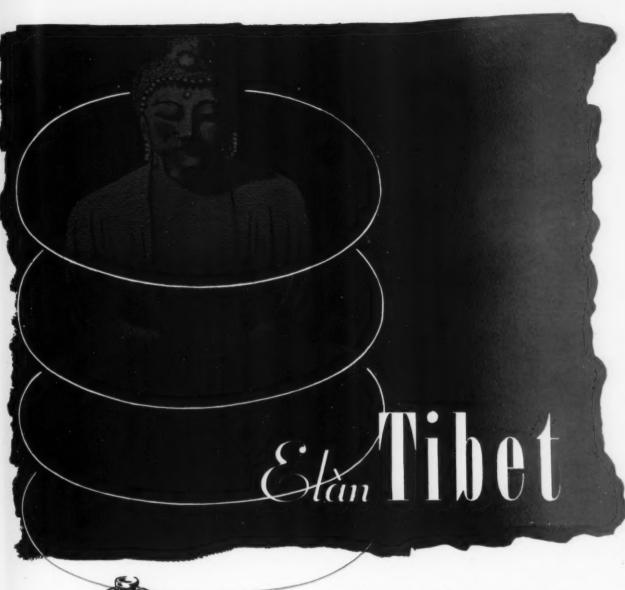
Exports of citronella oil from Ceylon declined sharply during the latter part of 1943. This is attributed largely to declining prices. Improved conditions resulted in an increase in production during the first half of 1944. Exports of cinnamon-bark oil during the first six months of 1944 increased over the corresponding period for the preceding year.

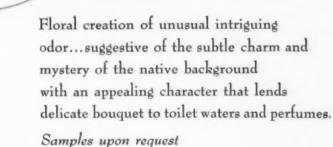
#### El Salvador

Sales of the 1943-44 coffee crop in El Salvador have amounted to 937,118 bags so far. Trading in the 1944-45 crop has been almost nonexistant since July.

#### **Honduras Copra Sales**

During June nearly 48,000 pounds of copra were sold in Honduras. This represents an increase of about 60 per cent over the preceding month.





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# War Check List—Government Regulations

Digest of Federal rules and regulations on price control, allocations and other regulatory measures of cosmetic soap and flavoring industries issued or proposed during the past month

#### Pine Tar Allocation

Liquid pine tar and tar oil have been placed under General Allocation Order M-300, as an Appendix A material. The order specifies that the allocation period is the calendar month, and the small order exemption is 54 gallons.

#### Lanolin Order Changed

The War Food Administration has amended WFO No. 76 to permit a more general use of wool fat for all users except cosmetic manufacturers. Their supplies will be authorized from time to time by the Director of Distribution. Inventories will be limited to a 30 day supply based on current operations. There is no small order exemption in the case of cosmetics.

#### Fair Trade Protection

The General Maximum Price Regulation has been amended so that fair trade prices to wholesalers as well as retailers are protected. This is done by substituting in Section 1499.13 (d) the words "wholesale or retail" wherever the word "retail" appears.

#### Cocoa Bean Quota

Grinding quotas for cocoa beans for the fourth quarter of 1944, will remain at 70 per cent, according to War Food Order 25.

#### Acetate Powder Allocation

Cellulose acetate and cellulose acetate butyrate powder for moulding have been placed under General Allocation Order M-300, Schedule 52. Under this order the allocation period is the calendar month, and the small order exemption is 100 pounds. In addition to allocation quantities, small order quantities may be used for experimental purposes. There is no limit on the dura-

tion of authority for use of material on hand or purchased under schedule.

#### **Gum Rosin Pricing**

Maximum Price Regulation 561 has been put into effect on gum rosin. Where purchase, sale or delivery of gum rosin take place outside the United States, and the product is imported, the Maximum Import Price Regulation shall apply. Maximum prices for sales on the Savannah, Ga., Cotton and Naval Stores Exchange shall be:

Per 100 pounds net in drums on yard Savannah, Ga.

Х														\$6.31	
W	W	F									*			6.31	
W	G													6.04	
N		ı												5.79	
м														5.63	
K														5.61	
1														5.57	
H														5.57	
G														5.55	
F														5.51	
E														5.41	
D														4.88	
В														4.81	

There is no minimum price regu-

#### Glass Container Quota Up

War Production Board Supplementary Order L-103-b has been amended to permit the more liberal use of glass containers for packing cosmetics. The quota for cosmetics, hand soaps, and shaving creams, which was formerly set at 60 per cent of the quantity used in 1943, has been increased to 130 per cent.

Closure quotas for solid and semisolid cosmetics are 85 per cent of glass use; fluid or powder cosmetics are 50 per cent; hand soap and shaving soap are 100 per cent. Blackplate is required. Percentage figures remain the same, but since they are based on glass use an increase of 30 per cent in quantities available occurs.

#### Order on Lead Foil Amended

Order M-38, restricting the use of lead was recently amended by WPB through Regulation 25. This authorizes field offices, in certain instances, to permit the use of the material for manufacturing civilian goods. It is not anticipated that the use of lead foil will be permitted for wrapping tobacco, candy, gum or beverages.

#### Lemon Oil Ceiling Price

An amendment has been passed and is on file to MPR 472, where according to Appendix C those who have contracted for lemon oil to be imported at a total cost higher than the maximum prices specified in paragraph (a) may apply for approval of a selling price above the permitted price. This may be done if the contract was made before June 15, 1944. Application should be made to Chemicals and Drugs Price Branch, OPA, Washington, D. C.

#### Peppermint Quotas Increased

The War Food Administration has announced an increase of peppermint quotas for most industrial users. The quotas were increased as follows: chewing gum, from 70 to 80 per cent; confectionery, from 70 to 80 per cent; pharmaceutical preparations, from 100 to 110 per cent; dentifrices, from 75 to 85 per cent; miscellaneous articles, 70 to 80 per cent. Industrial users affected by WFO 81 may use the increase without further application to WFA. Menthol manufacturers must still obtain allocations of the oil upon application to the director of Distribution, WFA.

#### Fats Quotas For Soap

Fats quotas remain unchanged by WFO-42-b replacing WFO-42, except that soapmakers may use 10,000 pounds of fats per quarter in addition to regular quotas, after the quota has been consumed.

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# The Confectionery of the Future

Nutritional advancement achieved in the confectionery field . . . Experiments sponsored by the industry to further enrich the vitamin, mineral and protein content of this food

by GEORGE F. DUDIK

Foodstuffs Unit, Bureau of Foreign and Domestic Commerce

THE national emergency has been a proving ground in which the sciences have developed potentialities to produce new wonders, of which autos of advanced design and "automatic" kitchens or laundries are perhaps examples. But in another sphere, without the dramatics evoked by the latest advances in metallurgy, mechanics, or electronics, is the confectionery industry, which is preparing its own particular miracle for the post-war period.

#### ADDED FOOD VALUE

Candy, in the days to come, may be expected to emerge as a fullfledged food which will compare favorably with any prepared food product on the grocer's shelf and will offer more by nutritional standards than many a hastily planned meal. Some recognition has already been accorded the food value of candy, especially in its energy-yielding properties arising from a high carbohydrate content.

Certain of the rations used by the armed forces are the product of the candy maker's kettle. Hard candy, once deemed simply a sweet, is now serving as a life-raft ration. Chocolate "D" bars, used to nourish the soldier under fire when neither hot food nor even pre-cooked canned food is accessible, are cousins to popular candy items.

The age-old appeal of candy has been its ability to satisfy the human craving for something sweet. Taste is, therefore, a prime consideration of any successful candy producer in determining the product he will make and market. Except in those emergencies when candy rations are used to support life and vigor in a time of temporary stress, people eat candy very largely because it tastes good.

#### TASTE APPEAL BROADENED

In the past, the confectionery industry's output has not been restricted entirely to products which were merely sweet and incidentally a source of energy. Ordinary hard candy serves these functions, yet only about one-fifth of all confectionery bought in the United States in 1943 consisted of types made chiefly from sugar and flavoring. The virtues of the cocoa bean, almonds, peanuts, raisins, milk and butter, and other ingredients of special nutritional value became apparent long ago to the candy maker as a means for broadening the taste appeal of his confections. The variety of candy offered the consumer has multiplied and the nutritional possibilities of confectionery have expanded with the use of such materials in increasing quantities.

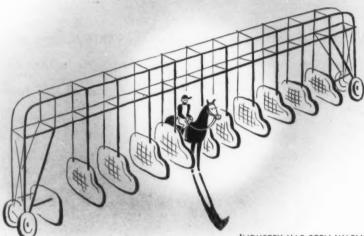
In the future, enterprising confectioners will continue to introduce new and more pleasing products as novel ingredients are adopted and production methods are improved. With less ostentation, but with important consequences for the nation's level of nutrition, will be the more subtle changes wrought in candy. These will improve nutritional qualities without perceptible alteration in either the taste or the form of the popular items, such as fudges, caramels, creams, and nougats, now on the candy counters.

#### STILL A CONFECTION

Enriched candies are not new to the confectionery industry-goods containing added vitamins or other "protective" food elements have been on the market for some time. Such confections, however, have been sold as much on their vitamin or special

[Reprinted from Domestic Commerce, August 1944 issue]

# DON'T BE LEFT AT THE POST-WAR PLANNING



INDUSTRY HAS BEEN WARNED by Jesse Jones, U. S. Secretary of Commerce, that the war may end suddenly and business should, therefore, be preparing now for the Post-war period.

The Committee for Economic Development reports that cessation of hostilities in Europe will release 80% of the nation's war production capacity for reconversion for civilian use.

Mr. Jones' warning and the report of the Committee for Economic Development should serve as a double spur to all Post-war thinking. When restrictions are lifted from war-prioritied cosmetic ingredients, don't be caught flat-footed and left at the post.

The merchandising, packaging and production experience and facilities of Allied Products may be a source of guidance at this time for the all-important, fast get-away and quick sales pick-up when war production barriers are raised. Arrangements for consultation can be made at your convenience, and without obligation, at your office or at the Allied Office in the R.C.A. Building in New York City.

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ingredient content as on their direct taste appeal.

The confectionery industry's purpose for the future is in no wise designed to make candy a mere vehicle for the administration of vitamin or other special nutritive elements. Candy will remain a confection—something eaten because it is delicious. But the vitamin, mineral and protein content of candy will be increased by the simple device of making good candy even better.

Experiments sponsored by the industry in the use of agricultural products, some of them now almost unknown to the commercial candy kitchen, have already borne fruit in the shape of candy of conventional type and taste, but containing increased quantities of thiamin, riboflavin, niacin, calcium, phosphorous and other food constituents accepted as necessary to proper nutrition. No synthetic vitamins, mineral salts, or concentrates were used in the production of these experimental candies, yet they represent a nutritional advance achieved in the confectionery

#### NEW INGREDIENTS TESTED

Among the experimental materials used were cottonseed flour, peanut flour, wheat protein flour, and lowfat soy flour. The candies produced ranged from pink nougats, vanilla caramels, and cast creams to chocolate-dipped fig rolls and fudge. Included in the formulas were 4 to 10 per cent of the special flours. Analyses of the candies showed a carbohydrate content of about 70 per cent, a fat content of about 10 per cent, and protein of 4 to 10 per cent. and also disclosed the presence of iron, phosphorus, and other minerals, and vitamins, particularly those of the B group.

Early results have been encouraging, but much experimental work remains to be done. The Bureau of Agricultural and Industrial Chemistry of the Department of Agriculture, which is conducting the experiments under an arrangement with the National Confectioners' Association, still has many problems to solve before the production of candies, improved along the lines indicated, will be possible on a commercial basis.

Some of the problems are matters of technique. It is desirable that some experimental materials be ex-



Candy is also a food

posed to as little heat as possible, and the best method of introducing them into the candy mix will remain under investigation for some time. Other problems include the procurement of desired materials in a form suitable for confectionery use. For example, experienced candy tasters sampling the new confections have complained of the coarseness of the flours used. To overcome this objection, millers have been approached regarding the production of more finely screened flours than those now available. Materials additional to the cottonseed, wheat protein, and other flours used in the early experiments remain to be tested. These include cereal and legume products, dehydrated fruits, fruit pastes, and fruit juice concentrates. And advances which have been made in fruit processing, resulting in reduced loss of vitamins in prepared fruit products, open another field to the confectionery industry in the way of materials and methods.

The progress made thus far points to post-war confectionery which not only will give us some surprises in new flavors but will have greater nutritional value.

#### Venezuelan Coffee

The Ministry of Agriculture estimates that the Venezuelan coffee crop for 1944-45 may come to over 800,000 bags of 60 kilograms each, compared with 500,000 bags in 1943-44, and 550,000 bags in 1941-42. Exports of coffee during the current quota year have been lower than in the past, and may fall short of the export quota.

#### Sugar Crop in Brazil

The production of sugar in Brazil during the first eight months of this year amounted to 17,629,976 sacks of 60 kilograms each. This was a slight decrease from the sugar crop of 1941-42, and 1942-43.

Sugar exports were over those of last year, although not as high as those in the preceding. Domestic consumption increased somewhat.



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# Important Factors in Detergency

This is revised from an address presented by the author before a number of sections of the American Chemical Society, the American Society for Testing Materials and other technical groups, especially prepared for the American Perfumer

> by FOSTER DEE SNELL Foster D. Snell, Inc., Brooklyn, N. Y.

S OAP has been a unique material over a period of centuries. It was only after scientific investigators had studied the make-up of the soap molecule and related this to its cleaning power that we learned how to add builders to soap to make its use more efficient and more economical. Only within very recent years have studies of detergency resulted in the successful development of a large number of new detergent materials and almost numberless wetting agents. The latter, second cousins to true detergents, take only a step or two in their direction, but nevertheless have many useful and practical applications. Both detergents and wetting agents are termed surface-active, since their molecules tend to concentrate and orient themselves in the surfaces of their solutions.

In order to study soap as a detergent, quantitative methods for measuring cleaning efficiency have been developed. Cleaning is itself such a complicated process that no single physical measurement with a detergent solution gives a complete picture of detergent effects. Much of the quantitative work has been done with soiled fabric, which may sound like a very special case of cleaning, but the principles discovered are fundamental and apply rather gen-

The known factors in detergency are (1) initial alkalinity or the pH of the detergent solution, (2) total alkalinity or the buffer value of the detergent solution, (3) its effect in lowering the interfacial tension between soil and water, and (4) the deflocculating and emulsifying power of the detergent solution. Each will be taken up. Many special cases include only some of those factors but the most complex cases include all of them.

#### CONTENT OF SYNTHETIC SOIL

If you were trying to visualize what might be present in soil, you would probably include inert particles insoluble in water, saponifiable oils, free fatty acids, mineral oil, proteins and carbohydrates. A synthetic soil can be built up on that basis. As inert dirt investigators have frequently selected carbon black. It represents the most serious contamination by inert dirt that is apt to be encountered in the laundry, and has the advantage that a mere trace can be detected by its color. Burnt umber has also been used; it is silicious in nature. As saponifiable oil, corn oil, cottonseed, or other similar oil of very low, known fatty acid content is suitable. Representing grease or lubricating oil, a standard grade of highly refined mineral oil is chosen to insure that it is of known and duplicable composition. A synthetic soil which has been used in our laboratories contains the following:

Carbon black ..... 4 grams Mineral oil ... 5 grams Cottonseed oil containing

0.38 per cent free acidity as oleic .... In some applications, particularly

when applied to fabrics, this is diluted with a volatile solvent such as carbon tetrachloride which subsequently evaporates.

Proteins have been ignored because they are removed by solution in water. And carbohydrates, if not water soluble, represent additional inert material and can be typified by the carbon black. That sounds like quite a mess and it is. But in cleaning, no one will dispute that just as difficult materials have to be removed. Of course, if the inert soil is white rather than colored and is

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NEW YORK • CHICAGO • DETROIT • LOS ANGELES • SAN FRANCISCO SEATTLE • PHILADELPHIA • TORONTO • MONTREAL • LONDON, ENGLAND not removed, it will not look the same as carbon black. But the above soil is particularly useful because its presence or absence can be detected by visual observation.

A great deal of work has been carried out with a standard soil consisting only of petrolatum and carbon black. The more complex form given above has a closer relation to soil as encountered in most cleaning operations.

#### SAPONIFIABLE OILS ARE ACID

Having a soil, we are ready to picture what happens when it is removed. As a fundamental hypothesis assume that no "clean," that is oilfree, dirt is present. In other words if dirt has nothing to stick it on, it will fall off, or brush off. Dirt which adheres closely to a surface is coated with at least a monomolecular film of oil or grease. The term oil is used to avoid confusion with compounded grease for lubrication. Oily dirt is essentially acid in nature because all saponifiable oils are acid. in fact most contamination known as dirt is more acid than that selected.

Most cleaning materials used industrially are alkaline. The pH of a soap solution, the most common cleaning agent, when free from excess alkali or builders, is 10.2. So its initial alkalinity is notably above the usual neutral point of pH 7.0. For purposes of discussion, pH 10.2 is referred to as the neutral point of soap. Any pH lower than that means partial decomposition of the soap, and a higher one means that alkali or builder has been added.

#### ALKALINE CLEANING MATERIALS

Why are so many detergents purposely alkaline? The answer is mainly because alkaline cleaning materials react with the fatty acid in the soil and assist in its removal. Substantial amounts of the alkali are destroyed in any typical cleaning operation. Some may be adsorbed and some may be destroyed by carbon dioxide from the air, but some of the loss is undoubtedly by reaction with the acidity present in the soil.

Soil is more readily removed by a strongly alkaline washing solution than by a weakly alkaline one. Thus a solution of borax and soap is not as effective as a solution of soda ash and soap. And soda ash and soap is not as effective as sodium metasilicate and soap. Beyond that are other alkaline salts such as sodium sesquisilicate and sodium orthosilicate at even higher pH levels. Of course one must consider the surface being cleaned and not use too high an alkalinity on such metals as aluminum and tin, or such fabrics as wool and silk. However, a higher alkalinity from a silicate is permissible than from other alkaline salts.

Since soil is acid and is going to destroy some alkalinity, the second factor to be considered is the total alkalinity above pH 10.2. Why above 10.2? Because with the neutral point of soap at that level, when it falls below 10.2 soap is being destroyed. Builder costs 2-5 cents per pound, soap over 10 cents. So it is bad economics to neutralize the acidity of soil with soap. This is well illustrated in the usual laundry cycle. The first operation is a "break" with plain alkaline salt solution. Why? To neutralize the acidity of soil on the fabrics and thus start the cleaning operation. In addition, this cold break has other functions not pertinent to this discussion.

The factor of total available alkalinity is sometimes phrased as buffer action. If limited to buffer action above pH 10.2 it is a correct description.

These two factors of initial alkalinity and total alkalinity can be nicely evaluated from comparative electrometric titration curves of the builders being compared. Such curves show that in terms of initial alkalinity the order of decreasing value is caustic soda, sedium orthosilicate, sodium sesquisilicate; sodium metasilicate, trisodium phosphate, soda ash, modified soda and borax. In terms of available alkalinity the series is similar but with a reversal of the order of soda ash and trisodium phosphate.

The third factor, lowering of interfacial tension, may be said to be an indirect measure of wetting power. The subject is complicated by an interrelation of factors. When soil is displaced from a surface it is wet and floated off. Since the soil has an oil film on its surface, this surface has the properties of a liquid. The interfacial tension of a sample detergent solution against an oil or other immiscible liquid, is readily measured by the stalagmometer

method or with the aid of the du Nouv tensiometer.

The complications of the chemistry of detergents pile up as we go on. The formation of soap in the interface by reaction of the detergent solution with the fatty acid in the soil is a big factor. If the alkalinity is great enough the interfacial tension becomes less than one dyne per centimeter, a value difficult to measure by stalagmometer methods. When one type of stalagmometer is used, the water falls through oil, with another the oil rises through the detergent solution. The latter more closely approximates actual detergency. Results by the two methods check rather closely. The du Nouy instrument has the advantage of giving accurate readings down to a fraction of a dyne.

On the basis of ability to lower interfacial tension, the builders with soap show decreasing surface activity in the same order as for their available alkalinity.

#### DISPERSING POWER OF SOAP

After the soil is wet and then loosened from the surface which is to be cleaned, it must be dispersed as discrete particles or deflocculated. Then it must be floated away as a result of the emulsifying power of the detergent solution. The combination of dispersing ability and emulsifying power is the fourth factor in detergency, since in practical work the two properties cannot be separated. Studies of the suspending power for a special oiled umber indicate that phosphates and silicates are relatively efficient in this property, the other builders are poor. Soaps are efficient in dispersing power.

By combining the effects of these factors which enter into evaluation of the rate of soil removal, the composite effect in descending order of efficiency is: sodium orthosilicate, sodium sesquisilicate, sodium metasilicate, caustic soda, trisodium phosphate and soda ash. The weakness of caustic soda in deflocculating and emulsifying power radically lowers its value in a composite evaluation.

But this evaluation of the efficiency of soap builders must be tempered with reason. Many detergent operations require that the solution come in contact with the hands of the worker. There practical



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Apparent, as manufacturers gird for the inevitable scramble for post-war markets, are new, sales-stimulating uses of Essential Oils. To producers who perceive, in this medium, new sales horizons for products of today . . . and tomorrow, MM&R laboratory technicians offer their cooperation.



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considerations as well as compensation laws prevent the use of some of the highly efficient mixtures of alkaline salts with soap in favor of others less irritating to the skin. In some uses contact with the skin is avoided and then the builders can be considered in terms of their efficiency.

In the presence of soap alone, calcium and magnesium compounds present in hard water form curds of heavy-metal soaps. Recent progress in the art has led to the addition of sequestering agents to avoid this precipitation. Tetrasodium pyrophosphate is the most important and is already present in most proprietary built soaps sold as granules. Sodium hexametaphosphate is somewhat more efficient but more expensive. Organic agents are also available having this special water-softening property. The use of such agents with soap marks one of the greatest advances in detergency in the present century. In their presence hard water acts like soft water. foams readily, and gives no precipitate of soap curds. Thus they reduce the soil to be removed by preventing precipitation of the heavymetal soaps. In hard-water districts half the soap is often used up as water softener, after which the precipitate so formed has to be washed away as part of the soil. Synthetic detergents which are resistant to hard water and which can be used with or without soap will doubtless find greater use after the war in hard-water areas. At present these are all allocated to Army and Navy use.

Segregation of the separate factors of wetting power and of emulsifying power is essential. There is a common misconception that they are the same, even in much of the patent and technical literature. Yet alcohol is a good wetting agent but certainly not an emulsifying agent, and to mention an extreme case, blacks are good emulsifying agents for oil in water but are hardly to be considered as wetting agents. Some of the synthetic agents are predominately wetting agents with little or no emulsifying value, others have both properties. Having both they are detergents of limited scope for uses where alkalinity is objectionable.

The study of detergency may be seen to present a number of theoretical aspects. The further such studies are carried the greater the possibilities for the development of new and better materials to aid in the time—and labor-consuming jobs of cleaning.

#### Belgian Congo Palm Oil

Belgian Congo is exporting increased quantities of palm oil and palm-kernel oil to the Union of South Africa for use in soap factories.

#### Yugoslav Hospitals Soap

Hospitals in Yugoslavia will produce their own soap when waste fats can be obtained. The necessary quantities of potash will be supplied.

### **British Honduras Soap**

Total imports of soap into British Honduras in 1942 amounted to 13,033 hundredweight, worth \$31,038. About two-thirds came from the U. S. and slightly less than one-third from the United Kingdom. The value of laundry soap imported from the U. S. amounted to about \$8,645.

A small quantity of laundry soap was exported, chiefly to Mexico.

#### Soap Production in China

Soap production in Free China has declined from 401,000 boxes in 1941 to 320,000 boxes in 1942, and 182,700 boxes during the first six months of 1943.

#### **Bahamas Naval Stores**

A plan is under consideration in the Bahamas, B.W.I., to obtain naval stores from Government-leased land. The project would get under way at Abaco, Andros Island, and Grand Bahama, and if successful, other timberlands would be included.

#### Fiji Islands Copra

The production of copra in the Fiji Islands showed a slight increase in 1943. Exports for the year amounted to 17,717 tons. This figure could have been increased had there been sufficient labor.

#### British Guiana Soap

An ordinance has been passed in British Guiana setting standards for soap which must be met by manufacturers or importers. Under this new ruling, soap must contain at least 60 per cent by weight of fatty acids, not more than 30 per cent by weight of water, and not more than 0.05 per cent of free caustic soda.

#### **El Salvador Imports**

During the first half of 1944 El Salvador imported 24,867 gross kilograms of soap; valued at \$15,031. Of this amount the United States supplied 24,818 kilograms with a value of \$14,958.

The total value of perfumes and perfumery materials for the same period of time was 64,780 gross kilograms, with a value of \$92,764. The United States shipped 70 per cent of this total.

#### Southern Rhodesia Soap

The value of all soap production in Southern Rhodesia increased to \$157,013 in 1942.

#### Palestine Olive Oil

Palestine produced 9,912 metric tons of olive oil during the 1943-44 season. This represents an increase over the previous season. There were 634 crushing establishments in operation, of which 150 were motor driven. These presses accounted for 57 per cent of the total production.

Palestine's olive oil production usually appears to be sufficient for local needs, with none left over for export. This was not the case during 1943 and 1944, however, as significant quantities were exported. Because of unfavorable weather conditions the outlook for the present season is poor.

#### Algerian Olive Oil

The entire 1944-45 olive crop has been requisitioned in Algeria through a regulation order issued June 9. This was done to assure the supplying of the country during wartime. The order applies to olives, olive oil, and foots.

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## New Products, Ideas and Processes

#### Polyethylene Glycols

Liquid polyethylene glycols for blending purposes and solid carbox compounds which are now being produced by the Carbide & Carbon Chemicals Corp. form interesting bases for cosmetic creams and ointments. The Carbowax compounds, it is pointed out, vary from soft to hard waxy solids and by blending any degree of hardness desired may be obtained. These bases it is stated are of especial interest because they resemble petrolatum but unlike it the polyethylene glycols are water soluble, a property often much desired. Full data about these interesting new products will be sent on request.

#### Rapid Water Analysis Apparatus

A rapid, precise method for determining the hardness, calcium and magnesium in waters, is furnished by the Aero-Titrater, offered by the Chief Chemical Corp., according to the company. The apparatus is simple and makes use of a new endpoint, based on the foam-meter principle. Determinations are said to be made within ten minutes and there is no waiting time to observe stability of lather. The instrument is supplied calibrated and ready for assembly and use. More complete information about it and its various uses will be furnished for the asking.

#### Rolamarker

Imprinting devices for a number of purposes, and of different construction, have been placed on the market by Adolph Gottscho, Inc. These markers may be used to imprint material with continuous impressions of a trade mark, or other information, on asbestos, cloth, cheese, plastics, etc., or to mark information on metal sheets. They may also be used to make single impressions on boxes or crates of manufacturer's trade mark, name and address, contents, etc. One form is available to mark rods or bars showing hardness, diameter, type, or other information, for store rooms, where ends painted to convey such information are sometimes cut off. Assemblies may be obtained to imprint two or more colors, side by side. Rollmarks are made to specifications to suit the particular needs of the work to be done.

#### To Stop Cement Dust

A new concentrated treatment for cement floors, diluted with three parts of water before use and applied by mop, brush, broom or sprinkler is said to soak deep into the pores of dusting concrete where it hardens to form a rocklike water insoluble mass that reinforces the binder and prevents surface particles from being worn away. After treatment with Synkrete, as it is named by the makers, the Synthex Products Co. cement floors are more resistant to traffic, oils, greases, chemical infiltration and water. Further information will be sent to anyone interested.

#### **New Type Matting**

A new type of matting for use in many places where rubber matting was formerly used has been made available by American Mat Corp. This new product is a solid plastic friction type mat made by binding friction compound together with plas-



**New Plastic Matting** 

tic. Its manufacturers state that it does not swell as rapidly as rubber when exposed to various types of oils. It can be trimmed to fit odd shaped spaces.

#### Self Bonding Floor Material

A new floor covering material has been placed on the market which is self bonding. Its manufacturers state that it is self-healing, in that small holes disappear under traffic. It may be laid by a plant handy man, over old concrete, without adhesives and if laid Saturday may be used the following Monday. Its makers, the Continental Asbestos Refining Corp., claim resistance to vibration, abrasion, and other effects of traffic for the new material.

#### Maple Flavor

In addition to the more usual uses of maple flavor, tobacco manufacturers are finding the maple flavor made by Standard Synthetics, Inc., to be very satisfactory in flavoring their product. Samples of this material will be sent to interested buyers if they write to Standard Synthetics Inc., 30 West 26 St., New York, N. Y.

#### Sea Shell Stoppers

Dainty stoppers for miniature bottles made from sea shells which are skillfully colored and which embrace the features of an inside screw; a shortened stopper tip which serves as an applicator; and a rubber band to insure a snug fit and prevent leakage, are offered by Glass Industries Inc., 10 W. 33rd St., New York, N. Y. The new stoppers have been patented. Further details about them will be supplied by the company to anyone interested.

## **New Catalogs**

Copies of a new official guide on commodities and services under price ceilings with a directory of the key operating officials of the various price units in OPA's National Office at Washington, D. C., is available in the "Directory of Commodities and Services." A charge of \$1 will be made for the booklet. Six monthly supplements to the directory, will be supplied without further charge.

The Neumann-Buslee & Wolfe, Chicago, Ill., wholesale price list is out. It may be obtained free of charge by interested firms.

How business, and especially small business, may obtain the credit it is soon going to need is the subject of a handbook, "Bank Credit: Your Postwar Program and Your Banker," issued by the Committee for Economic Development, New York, N. Y. This book is being sent to some 16,000 banks in the United States and to the 2,000 C.E.D. community committees. It may be obtained through these community committees.





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#### by ARNOLD KRUCKMAN

THE latest amendment to the Glass Container Order, L-103-b, in effect, if not in legal terms, makes glass containers available to the cosmetic and toiletries industries without practical limitation beginning October 1, and continuing during the months of the fourth quarter, October, November, December. Unless things go unexpectedly badly the relaxation is expected to be effective for many months to come.

In actual mathematical terms the new quota allocated to the industry permits the use of 130 per cent of the number of glass containers used for the 1943 pack. Small users are entitled to an exemption from quota restrictions up to \$5,000 worth of glass containers and \$1,500 worth of closures. There is no restriction on the production and use of closures made from blackplate rejects, and from waste. It is now also possible to make double shell closures. The expectation is that we will see the use of aluminum in this form of caps.

It was originally planned by the Containers Division people to make the exemption of \$5,000 for containers, and \$1,500 for closures, to apply to all users; this exemption was to form a sort of unrestricted base for every one. But the brewers stirred up so much discussion by attempting to secure some allowance for the beer bottles sent overseas on a one-way unreturnable trip, that WPB folk finally became impatient and reverted to the small users' exemption. It does not pay to be too pernickety in trying to grab advantages.

When, as, and if, the war in Europe is washed up, the WPB people promise all restrictions on glass containers and closures will be removed. There will be some restrictions, as for instance on tin which is expected to remain under restriction long after the war on both sides

of the world is over. Whatever slight restrictions hold-over will have to do with scant minerals, with manpower shortage, and, possibly, with transportation.

#### CONTAINERS

The amendment to M-81, effective October 1, permits the use of metal ends on fibre cans. This apparently will be welcomed by the industry. Thousands of complaints running into Washington reveal that people are irritated about the use of cans with paper ends. Metal for the purpose is now available to any one who uses fibre cans with ends made of metal waste or blackplate rejects. There is, unhappily, some prospect that production of fibre cans will run into a bottleneck. Paper is becoming scarcer and scarcer. Lumber and pulp are among the few things, together with chemicals and products of chemicals, which must remain under tight control, no matter what happens to the war. Other outstanding materials which must remain under control are all textiles. Aluminum, however, is so plentiful that it now sells for cents per pound while not long ago it sold for ten or more dollars. When the fabrication of the metal for cans can be brought to a cost which makes aluminum cans commercially available to the cosmetic and toiletries in dustries it is expected these containers will be popular by reason of their attractive appearance.

Fibre shipping containers are rapidly becoming scarcer. WPB has not been able to fix upon a material to make an acceptable substitute. The only current substitute appears to be the empty container. Its re-use is swiftly dwindling because the containers are wearing out. Wooden containers for a time reached a fantastic high price. By some curious omission the controlling Order failed to

mention the base year regulating prices of wooden box containers. The omission enabled any one to get into the business. The regular manufacturers were limited by the wages they customarily paid while other new enterprisers could pay twice as much or more. The selling prices were legally fixed on the producing costs. This permitted the newcomers to exact far higher prices than the regular manufacturers. The newcomers grabbed much of business because prices obviously were secondary to possession of wooden containers. The regular manufacturers who were being squeezed out by the competition made a big fuss, and finally managed to have the Order amended. Wooden boxes may now be purchased at their

boxes may now be purchased at their normal prices. War Food Order 81, recently amended, permits Peppermint Oil Ad-

ministrator A. L. Kalish to distribute 400,000 pounds domestic and foreign oil of peppermint, beginning October 1, during a year. Quotas were increased on the same date by 10 per cent for use by manufacturers of miscellaneous cosmetics, chewing gum, and confectionery. The quota for dentifrices was increased to 15 per cent. This raises the miscellaneous classification from 70 per cent to 80 per cent, and dentifrices to 85 per cent. The relaxation is due to a better crop of peppermint than was originally anticipated. The assumption

peppermint supply will largely take care of itself.

#### ALCOHOL SUPPLY

As is now generally known the quota of ethyl alcohol has been increased by 25 per cent of the quota permitted in 1943. The quota in 1943 was 50 per cent of the base year. The increase which became effective on October 1 for the last three months in

here is that from this time forth the

1944 therefore permits the industry to use 621/2 per cent of the volume used during the base year preceding June, 1942. It is still very doubtful, but there is some possibility that more ethyl alcohol may be available for the earlier months in 1945. Meanwhile, however, it seems very unlikely there will be any relaxation in the supply of isopropyl alcohol. There is some hope that more isopropyl may be available in the early months of 1945. Congress, in the meantime, has let it be known it intends to do something about the industrial alcohol plants owned by the Government. The Administration wishes to sell these plants on the same restricted basis as it plans to sell munitions plants. The Senate Agriculture Subcommittee, headed by Senator Gillette, of which Senator Aiken is a member, wishes to keep the plants in operation to use the facilities to absorb surplus wheat, to be transformed into industrial alcohol, to be used by industries such as the cosmetic and toiletries industry, and to make synthetic rubber. It has been stressed that industrial alcohol is needed, and that rubber is much needed (the Japanese war still being very much unfinished), and that the plants should be maintained to provide employment for the farms. Cutback in wheat production, while the farmers are paid for the wheat they do not grow, is regarded by the Senators much as the adventure which included the slaughter of pigs. WFA late in September announced there would be no restriction in the use of grain sorghums for the production of alcohol during the last quarter of 1944. The Cuban and United States Commissions which have been holding conferences in the State Department about U. S. Government purchases of alcohol, sugar, invert sugar, and blackstrap molasses. have suspended discussions until after the election. Another sign of the turmoil under the surface about alcohol and sugar is reflected in the persistent rumor here that WFA is moving vigorously to take the price control of sugar away from OPA. WFA has always maintained that ALL regulation of sugar and its products come within its jurisdiction. Congressman Cecil R. King, California, member of the Ways and Means Committee, has introduced HR 5413. which would amend the Internal Revenue Code to give the Federal

Alcohol Administration tighter control over all revenue regulations affecting alcohol.

#### LEMON OIL

Importers of lemon oil who suffer hardships by reason of the ceilings that were placed on imported lemon oil on June 15, 1944, now have recourse to an appeal which will enable them to adjust prices upward if they can show that "total landed costs are higher than the ceilings." Importers who purchased, or contracted, or who had established an irrevocable letter of credit to import lemon oil, before June 15, are now able to present their case by appealing to the Chemicals and Drug Price Branch, OPA, Washington, D. C. They must show the date of purchase, price paid and terms of sale, total quantity received or to be received, itemized statement of all import expenses, and copy of the irrevocable letter of credit or the contract of purchase. The authorization for the action is contained in Amendment 4, MPR 472, effective October 2.

Dr. O. E. May, Chief, Bureau of Agricultural and Industrial Chemistry, announced recently Drs. Howard P. Milleville and Roderick K. Eskew, at the Eastern Regional Research Laboratory, Philadelphia, have discovered a way to separate the volatile flavoring constituents which enables any one to preserve the natural fresh cider taste to be added to a concentrated apple juice. He says the "new product, a full-flavored apple juice concentrate, can be reconstituted by the mere addition of water, to an apple juice indistinguishable in taste and aroma from fresh cider. Fresh apple juice is heated rapidly enough to avoid modifying its natural flavor, vaporizing the volatile flavoring constituents, and then collecting them as 150-fold essence from a simple fractionating column. The juice from which the volatile flavoring constituents have been stripped is then concentrated in the conventional way, and the flavoring essence is added back to the concentrated juice. This gives a full-flavored, self-preserving, apple-juice concentrate. The process may be applied also to the recovery of flavors from other fruits and even berry juices." The process is described in detail in the Mimeographed Circular No. AIC-63, "Recovery and Utilization of Natural

Apple Flavors," and is sent upon request to the Eastern Regional Research Laboratory, Philadelphia 18, Pa.

U. S. Department of Agriculture reports California, Oregon and Idaho are producing this year commercial crops of caraway seed, upon an aggregate of approximately 1,000 acres. Both annual and biennial types are grown. This is the first commercial production in the United States, OPA reports there is such need for popular low-cost hard candies that it has made production of lemon drops and peppermint drops possible as established last year for other hard candies. Previously lemon drops and peppermint drops were frozen to prices charged in March, 1942. The Order also reduces the required pieces per pound from 110 to 70. A large increase in manufacture is forecast. In August over 20,000 pounds assorted essential oils were lend-lease shipped, mostly to British destinations and to Russia.

#### FATS AND OILS

Elmer Tysdal, Chief Cosmetics Unit, WPB, has had hopes there would be an allocation of lanolin for cosmetics in October. It is barely possible, still, some may be made available. But the chance is remote. If there is any relaxation in military requirements there is some hope lanolin may be allocated before the year's end. WFA Order 42, effective September 30, made 10,000 pounds more fats and oils available for use of the industry, especially for shampoos, soaps and similar products. The allocation was made for the fourth quarter, October, November and December. Fats and oils, as reported, will diminish next year by 13 per cent, 1,500,000,000 pounds. The principal decline is in lard and linseed oil. Prices are expected to be at ceilings. The service men in the Pacific areas need more soap than the forces in Europe. Chemicals Bureau of WPB says more synthetic soaps will be needed. Castor beans have decreased in production in Brazil, approximately 10 per cent. There will be a greater yield of olive oil in Spain. Babassu oil is used in Brazil in soap as a substitute for olive oil. Commerce Department reports we are now receiving palm oil (and cocoa) from British Africa. And it is reported there is a great demand in



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> plier of Lanolin and Degras are available to you, together with samples, should you prefer to conduct your own tests.



1. LOWEST ODOR VOLUME

2. GREATER UNIFORMITY

3. BETTER COLOR QUALITY

4. SMOOTHER TEXTURE

5. FINER BODY CONSISTENCY

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America's Largest Suppliers of LANOLIN • Anhydrous U.S.P. • Hydrous U.S.P. • Absorption Base • Technical DEGRAS • Neutral and Common • WOOL GREASES

147 LOMBARDY STREET . BROOKLYN, NEW YORK

& Essential Oil Review

October, 1944 74a

this country for English shaving soaps and shaving lotions, and that some demand may be filled very scantily for the holiday trade. There also is a report that a Los Angeles firm has devised a process which prevents cosmetics from running in hot weather. Face cream, lipstick and rouge paste are heated to 125 degrees Fahrenheit, to fluidity; then mixed with a small quantity of material such as cottonseed oil stearin, with a high melting point. After cooling to 85 degrees, air is introduced and makes a firm cream, neither soft nor hard, which keeps its consistency for a long time in high temperatures.

#### MENTHOL PROSPECT

An effort is under way to grow mint (mentha amensis) in Haiti. A shipment of roots has been sent there by the U.S. Government and will be cultivated by native agriculturists. The roots were obtained from North Carolina and California as best adapted to the climate of the Caribbean. The project is under supervision of trained men. It is expected the crop may be harvested by next March or April, and that the oil will be distilled in Haiti for the production of menthol. There is every reason to feel the undertaking will be successful, and will make us less dependent upon supplies from Brazil. It also is reported that there may be a surplus of menthol in China which now may be brought out. In the Kung-Ming area there are reported to be anise and cassia besides menthol. It has hitherto been impossible to secure the materials because there was no way to transport them to the ports in India. The U.S. Army now is said to have surplus cargo space in some of its large planes, and will accept this type of freight at the rate of 63 cents per pound. The assumption is that the Army will not accept any freight of this kind unless it is reasonably assured there also will be cargo space on ships from the Indian port. Priorities must be arranged by the purchaser. The transaction to obtain the material must be conducted privately by the purchaser with his usual brokerage connections. The priorities may be arranged by negotiation with Lieut. Langdon P. Marvin, U. S. N., who is Chief, Air Cargo Priorities, WPB Program Bureau, in Washington, D. C. When purchases are organized under Government auspices the negotiations are conducted by the U. S. Commercial Company, a Government corporation, which comes under direction of Sidney H. Scheuer, Executive Director, Bureau of Supplies, FEA.

Fees for registration of American toilet and cosmetic preparations in Mexico have recently been reduced from \$40.50 to \$4.05 each. The Alien Property Custodian has announced regulations which modify the paper work heretofore required to obtain the use of foreign patents under his control. There also has been a material reduction in the price.

WPB has arranged special consideration to speed the acquisition of materials and facilities required by discharged war veterans who wish to engage in smaller business ventures. The new policy relates to enterprises in which not more than 80 persons are employed. WPB industry divisions and field offices have been instructed to give special attention to applications by veterans honorably discharged since December 31, 1940, by Army, Navy Marine Corps or Coast Guard.

Restrictions on zinc and zinc products have been modified by amendments to Order M-11-b, but prohibitions still apply to compacts, cosmetic containers, lipstick holders, lotion dispensers, perfume dispensers.

#### PRICE CEILINGS GUIDE

OPA has issued a new official guide on commodities and services under price ceilings with a key directory to operating officials in Washington. The listing covers over 6,000 items. The cost to the public is \$1 per copy, with six monthly supplements. It is made up in four parts. Part 1 lists chief price officials with titles and telephone extension numbers. Part 2 lists all OPA regulations by number and titles, the number of amendments, lists the branch administering the regulation, and defines the type of seller covered by the regulations. Part 3 is an alphabetical index of the 6,000 commodities and services under price control. It lists the price regulation for each commodity, and the branch administering the regulation and the number of section head in charge. Part 4 lists each Price Branch and the commodities covered. There are adequate crossreferences.

Veterans are now practically free

of all WMC and similar labor regulations. They may offer their services to whomever they please with. out securing authorization from WMC or USES. This means the employer may hire them without reference to any Government agency. It is reported here manpower troubles in the cosmetic and toiletries industry are especially acute in labor areas 1, 2, and 3. In many places the industry is hiring so-called floating labor which usually remains two days. Those who work only two days at a time do not come under WMC restrictions. Some industries appeal to women to accept employment for one or two days at a time. This type of labor is said to have brought relief to some industries comparable to the cosmetics and toiletries industry. The general situation at the time this is written is not regarded in Washington as holding forth much hope that there will be any early improvement in the labor supply for civilian industry. Any close analysis of the many discussions of V-E day relaxations will show that the discussions turn chiefly upon plans, not upon specific commitments for relaxation at a specific calendar time. The excitement is mostly attributed to politics. Unless the German front collapses definitely in the very near future it is assumed here the war will continue into next year, possibly as long as Spring. The Japanese war is regarded as still a matter of more than a year. There are many here who believe the entire relation of Washington to the economy will change after the election. There are many signs that numerous types of supplies will again come under tighter rationing. It also will interest you to know that the best informed people here do NOT expect a great slump when the war is over. Whatever interruption comes is expected to be purely local and purely temporary. These people more or less in the know assume the need for what we make will be great, both here and abroad, and that every pressure will be exerted post war to force the economy to make the switch as swiftly as possible. These people anticipate neither unemployment in any extended period or number, nor do they anticipate any material interruption in industrial production. It is expected that war agencies will have reduced staffs by one-half by January.





# U.S.I. CHEMICAL N

## U.S.I. Announces Two New Phenolics

Unusual Properties Exhibited by New "Arochem" Resins

Of timely interest to formulators of varnishes and vehicles for protective coatings, and to and vehicles for protective coatings, and to ink manufacturers and other resin users, is U.S.L's introduction of two phenolic-type resins, especially developed for present-day use with soft oils, Both of these resins are currently available for many civilian enduses, although application must still be made, as usual, under W.P.B. Order M-246.

#### S&W Arochem 337

S&W Arochem 337 is especially useful in quick-drying varnishes, quick-drying enamels for either general or industrial use, floor paints, spar varnishes, over-print varnishes and printing inks. This high melting point, modiresin imparts faster bodying rate, faster drying properties, superior resist-ance to alkali and water, and greater film hardness and mar resistance than most modi-fied phenolics in varnishes of equivalent oil

Ease of handling is another feature. Although it has an exceptionally high melting point, it is readily soluble, without special point, it is readily somble, without special cooking procedures in most high viscosity oils. In nearly all cases, the total resin and oil content may be charged into the kettle at the start and taken to top heat without any "kickout" or formation of gel particles. Due to the short cooking schedules required, varnishes made with S&W Arochem 337 are light in

While this resin is too reactive to be used with tung oil alone, satisfactory varnishes may be produced by the addition of moderate amounts of less reactive resin or oil to the

#### S&W Arochem 338

S&W Arochem 338 is particularly well suited for use in gloss ink vehicles and over-print varnishes as well as varnishes and enamels for general and industrial use.

This resin, like S&W Arochem 337, is a modified phenolic, but it has a higher melting point, and being less soluble in solvents and oils, is more rapid in its bodying action. Developed primarily for use in printing inks and over-print varnishes, it produces ink vehicles of exceptionally high viscosity when cooked with linseed or other drying oils. This shortens the manufacturing holding times. Due to the unusually large molecular structure of the resin, the resulting vehicles dry to extremely

(Continued on next page)

Acid Number:

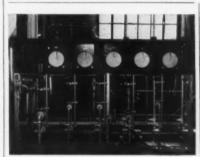
Soluble in:

Color: Specific Gravity:

# Tonnage Production of Indalone **Involves Novel Claisen Reaction**

Manufacture of U.S.I.'s War Important Insectifuge Among First Large-scale Commercial Uses of this Type Condensation

Although every organic chemist has had laboratory experience with Claisen-type condensations, until recently only few have done much with these interesting



Centralized control has played an important part in the successful tonnage-scale production of Indalone. Here you see one group of sensicontrollers, and recording instruments in U.S.1.'s Baltimore plant.

#### **Finds New Short Cut** to Zein Solutions

Current practice in preparing zein solutions calls for use of dry extracted zein to which is added a suitable solvent. Production of dry added a suitable solvent. Froduction of dry zein is a laborious and costly process involv-ing the separate steps of precipitation, filter-ing, settling, washing and drying.

A newly patented process claims to greatly

simplify the production of zein solutions and coating compounds by preparing them di-rectly from the corn gluten. In the new method the granular or powdered gluten is first treated with a low boiling point zein protein solvent such as ethanol, or a mixture of such solvents.

Next the extract solution is separated from the residual gluten by filtration or centrifug-ing, and is then mixed with a base solvent of ing, and is then mixed with a base solvent of relatively high boiling point, such as ethylene glycol. Distillation removes the low boiling extracting solvent, leaving behind the zein dis-solved in the base solvent and ready for use.

reactions on a large commercial scale. The sudden demand for atebrin. sulfa-

merazine, vitamin B1 and U.S.I.'s Indalone, as a result of the war, has focused wide attention on the tonnage production of such chemicals and has brought many developments of both present and postwar significance. First of these from the standpoint of tonnage is U.S.I.'s manufacture of Indalone, vital ingredient in the government's new all-purpose insect repellent.

#### War Demands Met

Starting in the early 1920's with the first commercial production of acetoacetic ester, U.S.I. followed with the commercial-scale operation of a second Claisen reaction to produce sodium oxalacetate. This, in turn, was followed by the commercial introduction of Indalone in 1939. Tremendously stepped-up production of all of these products has been necessary to meet the huge war demands. This is particularly true of Indalone, production of which has been multiplied ten fold.

#### Basic Reaction

The reactions employed in the production of Indalone are shown on the next page. Mesityl oxide and dibutyl oxalate are first combined in a Claisen reaction using sodium butoxide as the condensing agent. This forms the sodium salt of Indalone which is then neutralized with dilute sulphuric acid. The process is carried out in the following stages.

#### **Condensation Stage**

Carefully measured quantities of mesityl oxide and dibutyl oxalate are added to the (Continued on next page)

#### New Hydroscopic Ink For Recording Meters

One problem presented by recording meters of various kinds has been to find an ink which in the recorder pen will be able to withstand considerable exposure to the atmosphere without thickening or clogging, regardless of outside temperature or humidity, yet be fast drying after application.

A recent patent calls for a combination of a brilliant red dye with a tartrazine yellow for luminosity in a medium composed of water, ethanol, glycol and acetic acid. The hydroscopic effect of the glycol tends to absorb moisture from the air, thereby preventing the ink in the recorder pen from drying out. However, once the line is traced on the paper chart. the glycols are readily absorbed by the paper, thus producing a fast-drying ink. The acetic acid is added as a preservative.

#### RESIN SPECIFICATIONS

#### S&W AROCHEM 337

30-40 Melting Point: (Mercury) 150-160°C. N-K 1.1

Coal-tar and petroleum hydrocarbons and the usual solvents; in oils, both high and low viscosity.

#### S&W AROCHEM 338

25-35 160-170°C. N-K

1.1 Coal-tar hydrocarbons and lacquer solvents; medium and low viscosity oils.

NOTE: S&W Arochem 337 is insoluble in ethyl alcohol, S&W 338 is insoluble in petroleum hydrocarbons, although solutions will tolerate a high proportion of these solvents; it is completely insoluble in ethyl alcohol,

# U.S.L. CHEMICAL NEWS

1944

#### Novel Use of Solvents Improves Moulded Plastics

Color, transparency, and strength of certain transparent moulded plastics, formerly was impaired by small quantities of unreacted olefin and catalyst residue remaining after the reaction was completed. These impurities caused opacity after moulding and adversely affected the mechanical strength of the moulded article.

According to the claims appearing in a recent patent on olefin-sulphur-dioxide resins, a new process entirely eliminates these detria new process entirely climinates need eter-mental features. Crude olefin-sulphur-dioxide resin, in finely divided form, is treated with a blast of air or inert gas carrying vapors of a resin solvent such as acctone. The solvent penetrates the fine resin particles, and softens them.

Best moulding results are obtained when minute traces of the vaporized solvent are allowed to remain in the resin until it moulded. According to the inventor, articles moulded from the new resin possess greater transparency and strength, and due to absence of unreacted ingredients, do not undergo a secondary reaction which changes their color after moulding.

#### Two New Phenolics

(Continued from preceding page)

hard, tough films with maximum "hold-out"

and gloss.

In the production of varnishes and enamels, S&W Arochem 338 usually requires special cooking when used with most pre-bodied oils, and is too rapid in its bodying action for use with oils like tung, without modification. Thus Arochem 337 is generally preferred for these

U.S.I. will be glad to send samples and further data on both resins to anyone inter-

#### Tonnage Production of Indalone Involves Novel Claisen Reaction

(Continued from preceding page)

reaction vessel together with sufficient benzene to assure complete solution of the sodium salt of Indalone at the end of the reaction. After thorough mixing, a carefully measured quantity of sodium butoxide (in butyl alcohol solution) is added. The reaction vessel is equipped with heat exchangers for removal of heat generated by the reaction.

#### Neutralization

After the reaction has been completed (12-24 hours) the alkaline crude is neutralized with diluted sulphuric acid. This operation is critical and in the past has always been done on a batch basis. However, it is now being done with complete success using a continuous method developed at U.S.I.'s Baltimore plant.

#### Distillation and Recovery

The neutralized crude obtained from the above step is stripped of volatile solvents — benzene, butanol, and water — by a series of continuous vacuum distillation columns. The benzol and butanol are subsequently refined and returned to succeeding condensations. The stripped crude contains Indalone and a small amount of tars. The Indalone is recovered from the stripped crude by a continuous flash-distillation process, operating at 2 to

4mm. Hg, absolute pressure.

Approximately 90% of the Indalone is recovered in the flash-distillation process. The remaining 10% is present in the tar residue withdrawn continuously from the process. The Indalone present in these tars is subsequently recovered by a batch, low-pressure distilla-

tion process

#### TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

A water-resistant resin adhesive has been developed for use in mounting and over-coating paper and for other industrial applications where moisture resistance is needed. It is claimed that this new, clear adhesive will withstand a 48 hour immersion test, and that its long wel-life prevents paper wrinkling, makes registration casy. (No. 859)

Flame-proofed felt for vibration damping and insulation in high-temperature areas has been announced. It is claimed that this chemically treated felt can be exposed to the direct flame of a bunsen burner without either combustion or after glow.

(No. 960)

#### USI

A new rust-removing compound is claimed to facilitate pre-painting preparation of metal surfaces. The crystals of the preparation are said to become part of the metal and to be paint absorbent.

(No. 861)

#### USI

A tackifier for synthetic rubber, which is said to have added use as an extender, has been announced. The new product is claimed to be soluble in aromatic hydrocarbons, vegetable and mineral oils, and synthetic rubber. Some tack remains after vulcanizing. (No. 862)

Rubber heel marks and dirt may be removed from wood, cement and linoleum floors by a new cleaner, according to its manufacturer. (No. 863)

#### USI

New flux for brazing preparation of cast iron, has been developed. It is said to produce a un-formly successful tinning prior to brazing. (No. 864)

A non-slip liquid wax, which, according to the manufacturer, requires no buffing and which may be applied with cloth, mop or spray equip-ment, has just been put on the market. (No. 865)

#### USI

Two new protective creams have been designed to protect worker's hands. One is water soluble for dry work; the other is for protection where water and mild chemical solutions are present. (No. 866)

#### USI

New dye for vinylite plastics, designed for dip application is available in yellow, orange, rose and green. A dip of 5 seconds is claimed to give a pastel shade, while  $\alpha$  60 second dip gives deep tones. (No. 667)

#### USI

A new plastic resin adhesive, said to be color-less, of low viscosity and water-soluble, has been placed on the market. It is intended to be used with a co-agent in laminating and sizing textile fabrics and paper.

#### SYNTHESIS OF INDALONE

 $CH_3$   $C = CHC CH_3 + COOC_4H_9$   $N_8OC_4H_9$  $CH_{3}$  > C = CHC - CHC - COOC<sub>4</sub>H<sub>9</sub> + C<sub>4</sub>H<sub>9</sub>OH  $H_{2}SO_{4}$ 3>C-CH2C-CH=CCOOC4H5+C4H5OH+N32SO4

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#### ACETIC ESTERS

## OXALIC ESTERS

PHTHALIC ESTERS

OTHER ESTERS

#### INTERMEDIATES

#### ETHERS

Ethyl Ether Absolute A.C.S.

#### FEED CONCENTRATES

\*Curbay B.G \*Curbay Special Liquid \*Vacatone 40

#### RESINS

ACETONE

S&W Ester Gums—all types S&W Congo Gums—raw, fused & esterified S&W \*Aroplaz—alkyds and allied

materials S&W \*Arofene—pure phenolics S&W \*Arochem—modified types S&W Natural Resins—all standard

## OTHER PRODUCTS Ethylene





# Here and There Among Our Friends

Percy C. Magnus, president of Magnus, Mabee & Reynard, Inc., 16 Desbrosses St., New York, N. Y., was elected a trustee of the Philadelphia College of Pharmacy and Science recently. The Board of Trustees of the College consists of 24 members.

Miriam Gibson, director of publicity for Shulton, Inc., New York, N. Y., and a member of the Fashion Group and Advertising Women of New York City, was married to George S. French, warrant officer of the Maritime station in St. Petersburg, Fla., September 9. Out-oftown guests were Mr. and Mrs. Donald Henry. Mrs. Henry is associate editor of Industrial Gas and of Gas Age.

Dr. Edward V. Killeen, a veteran of 53 years with the organization of George Lueders & Co., New York, N. Y., was a boyhood friend of the late Alfred E. Smith, former governor of New York and Democratic presidential candidate in 1928. The friendship continued through life and just a week before the death of Mrs. Smith, May 6 of this year, Dr. Killeen visited Gov. Smith in his office in New York. In 1938 when Gov. Smith made his first trip abroad, Dr. Killeen who had been traveling on the continent returned with him on the SS Manhattan.

Captain Thomas C. Sheffield, well known as the Western Manager of the New England Collapsible Tube Co., is now working as executive assistant to General H. H. Arnold, Commanding General, Army Air Forces. Captain Sheffield recently accompanied Mr. Robert Lovett, Assistant Secretary of War for Air, on an extensive inspection tour of air force installations in England and France.

New York, N. Y., returned to his desk October 1, after an absence of three months during which time he underwent two operations, one a major operation for a broken appendix

which confined him in the Mountainside hospital, Montclair, N. J., for seven weeks. Due to skillful surgery and the use of penicillin, both operations were highly successful and his period of recuperation from August 20 to October 1 was unusually rapid in view of the seriousness of both.

Milton F. Martin, who is well known throughout the toilet goods and flavoring extract industries has

been appointed assistant general sales manager of U. S. Industrial Chemicals Inc., New York, N. Y. Mr. Martin was graduated from Yale University in 1935 with the degree of A.B. after which he



Milton F. Martin

joined the sales department of U.S. Industrial Chemicals Inc. and served in New York, Philadelphia, Cleveland and Detroit for nearly four years. He was called back to New York in 1938 to assist L. A. Keane, vice president in charge of sales. He filled this position with marked ability up to the early Autumn of this year when he was made assistant general sales manager. Throughout the war Mr. Martin has acted as executive secretary to the Post War Planning Board of which F. B. Adams is chairman and Glenn Haskell, president of U.S. Industrial Chemicals Inc., is vice chairman. In addition to contributing articles of various business papers and associations Mr. Martin has written two books, both noted for their originality: "Trout Lore" and "Life with Baby." In the light of the research that has been carried on by the chemical and allied industries Mr. Martin is optimistic over the outlook for the cosmetic and flavor industries.

Dr. Georges Acuna who has been identified with some of the leading perfume and essential oil houses in France, Brazil, Costa Rica, the British West Indies and the United States for many years has joined Van Dyk & Co., Belleville, N. J., where he is in charge of directing the perfume compound department and is also manager of the export department. Dr. Acuna was educated at the University of Liege, Belgium, where his doctorate thesis was on sugar and alcohol. His training in the production of essential oils and aromatic chemicals was received under Dr. Rene Gattefosse of Lyon, France, He went then to Costa Rica as chemist at the Fabrica Nacional of the government of that country. Subsequently he was associated with Lentheric and later with one of the largest houses in Brazil. As he speaks French, Spanish and Portuguese as well as English he made good use of his command of languages and his knowledge of the raw materials and finished goods fields to develop business throughout Latin America. In 1932 he joined Van Dyk & Co. where he continued until 1940 and for a year or so before his present association he was with S. B. Penick & Co. He has been for many years a member of the Faculty of Engineers of Costa

Frank J. M. Miles has become associated with Compagnie Parento Inc., New York, N. Y., as perfumer in charge of research and developments. Mr. Miles is well known in the industry as a perfumer, first with Melba and then with Houbigant and Cheramy as vice-president in charge of manufacturing. Mr. Miles then joined Colgate and Co. where he supervised manufacturing until he established research laboratories in California as consultant to several of the leading perfume houses and for the study of domestic flower and essential oils production. Returning to the East, Mr. Miles was connected with another essential oil house for several years until he joined Compagnie Parento Inc. Mr. Miles has always been interested in research work and maintains a laboratory at his home.

▶ Kelly Y. Siddall, controller of the Procter & Gamble Co., Cincinnati, Ohio, has been elected a vice president of the Controllers Institute of America, a technical and professional organization of controllers devoted to the improvement of controllership procedure. AROMATIC CHEMICALS . ESTERS



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The American Perfumer

78 October, 1944

# NEWS and EVENTS

#### Demonstrator Use Clarified In Elizabeth Arden Order

Elizabeth Arden, Inc., New York, N. Y., has been ordered by the Federal Trade Commission to cease violation of the Robinson-Patman Act through discriminating among retail purchasers of its cosmetics by furnishing to some of these customers demonstrator services which are not offered to competing customers on proportionally equal terms.

The findings of the Commission show that Elizabeth Arden has for a number of years furnished a few of its retailers customer salesgirls to sell the Elizabeth Arden line. The salesgirls' duties are primarily, though not exclusively, the sale of Elizabeth Arden cosmetics. These demonstrators have sometimes been paid direct by the respondent, but more frequently the store in which they work pays their salary, and is then reimbursed either in whole or in part. Occasionally a percentage of the invoice value of the merchandise sold is applied to the demonstrator's salarv.

There have been no fixed requirements, and each transaction between Elizabeth Arden and the store has been on an individual basis. The Commission has found that Arden's terms are such that few customers can comply, and that smaller customers are excluded from obtaining the service on a proportional basis.

"The Commission is of the opinion that 'the statute affords the seller a free election in the first instance as to what services or facilities, if any, he will provide to purchasers of his products; but having elected to furnish a particular service or facility to a particular purchaser or purchasers, he thereby assumes the obligation of according similar services to all competing purchasers to the extent required by the statute. The statute does not permit a seller to so tailor his terms as to favor a particular customer or group of customers

and automatically exclude all the rest of his customers."

This order has the effect of clarifying just where the manufacturer stands on the matter of demonstrators, a subject about which there has been much confusion.

#### Edith Jessie Mullen Married to F. M. Thompson

Miss Edith Jessie Mullen, daughter of Mr. and Mrs. Albert E. Mullen of Pelham, N. Y., was married, September 23, to Frank Mortimer Thompson, son of Mrs. Catherine Thompson of Yonkers, N. Y., in St. Catherine's church, Pelham. The wedding was a social event and was followed by a





Mrs. F. M. Thompson

A. E. Mullen

reception at the Pelham Country Club attended by about 200 guests, including a number from Canada, Hollywood, Calif., Chicago, and other states. The bride's father is well known throughout the industry both in the United States and Canada as manager of the Apli Division of Allied Products Inc., New York, N. Y. The bride was graduated from the College of New Rochelle in 1940 and the bridegroom is an alumnus of Manhattan College and is employed by the Western Electric Co. in New York City which he joined shortly after the outbreak of the war, as an expeditor in radar production. Following the ceremony Mr. and Mrs. Thompson left for a honeymoon in the Pocono mountains and on their return the couple will live in New York City.

# Houbigant Appeals Use of French Name to Supreme Court

The Federal Trade Commission has held for some time that firms which had formerly manufactured perfumes in France, and had been forced to transfer the manufacturing operation to this country because of the war, or because they found it to be otherwise advantageous, may not be permitted to use the word France, or Paris, in their labels—or, indeed, to use their corporate names without explaining that the products are made in the United States.

Houbigant and Cheramy, both of New York, have appealed a decision of the Circuit Court of Appeals in New York City upholding an order from the Federal Trade Commission to the Supreme Court, in an effort to use their French names.

This is a test case which is likely to have far-reaching effects upon the perfumery industry, and its outcome will be watched with more than ordinary interest.

#### National Beauty & Barber Mfrs'. Assn. Elects Officers

At the third annual convention of the National Beauty and Barber Manufacturers' Association, held in Chicago, Ill., Jule Gordon was reelected president. Joseph A. Gallagher was reelected secretary, and Harold F. Bertrand was reelected treasurer. The other officers of the Association who were reelected were: First vice - president, Edward J. Breck; second vice-president, Roy S. Bain; third vice-president, Phil D. Spaeth; fourth vice-president, Wm. H. H. Davis. Les M. Hildreth replaced Raymond A. Kaltwasser as fifth vice-president. Harold M. Cook and Martin E. Revson, who are now serving in the U.S. Army, were reelected honorary chairmen of the Board of Directors. All members of the board were reelected with the exception of J. L. Younghusband, who is replaced by R. E. Lee.

79



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Headquarters

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AND OTHER
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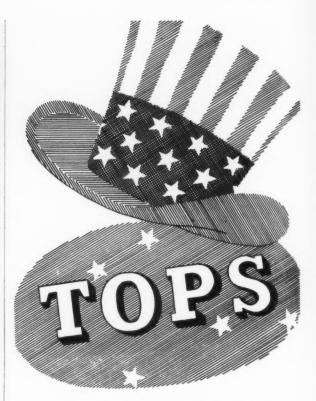
Samples and prices gladly furnished on request.

Division of S. B. Penick & Company

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We are not merely sellers of Neutral Soap. We furnish expert consultation on formulas. One of our customers has saved \$35,000 annually for several years. Let us show you the safe way to cost economies with POWCO Neutral Soap.



POWDERED NEUTRAL SOAP

JOHN POWELL & CO.

116 East 32nd Street,
New York City.

# Lanolin Allocation for Cosmetics Industry

The WPB passed an allocation on October 6 granting 75,000 pounds of lanolin to be used by the cosmetics industry during the months of October and November. It is intimated that if the supply holds up well another 75,000 pounds may be forthcoming for use during November and December, but there is no assurance that this will occur. In any event, the relief appears to be temporary.

#### Jergens Plans Postwar Expansion

The Andrew Jergens Co., Cincinnati, Ohio, has made plans for the construction of a large plant in Amberley Village. The expansion program will get under way if consent is granted. An outlay of about \$1,000,000 is contemplated.

#### Anderson Joins Ogilvie Sisters Sales

Ogilvie Sisters, Inc., New York, N. Y., announce the appointment of Fred Anderson to drug and department store accounts in Northeastern United States. Prior to this connection he was with Schiaparelli, and with Kathleen Mary Quinlan. Other changes in territorial assignments effected by Ogilvie Sisters are: Miss Bernice Steele to Arkansas, Kansas, Texas, Louisiana, Missouri, Nebraska and Oklahoma; and the addition of Ohio and Indiana to the territory formerly assigned to Miss Georgia Harland.

## Changes in McKesson & Robbins Personnel

McKesson & Robbins, Bridgeport, Conn., has announced a number of changes in executive personnel. W. F. Hindley has been appointed manager of the Atlanta Division, replacing J. H. Abercrombie, transferred to the manufacturing division at Bridgeport, Conn., as assistant sales manager in charge of vitamin products. In Boston, Mass., Francis M. Fitzmaurice has been appointed liquor sales manager, replacing William C. Schmidt, resigned. Walter F. Rawlins has been appointed sundries buyer and J. Hulun has been appointed drug buyer at Detroit. H. J. Flowers, former buyer at this division, has resigned. The new merchandising manager at Louisville is G. A. Hennies, succeeding J. W. Gilliam, who has been transferred to New Haven, as merchandising manager. Jerome C. McGenee has been appointed sales manager at the 8th Avenue Division, New York, N. Y., replacing R. G. Elson, who has resigned from the company.

#### Florasynth Laboratories Executives Meet

The officers and directors of Florasynth Laboratories, Inc., 1513 Olmstead Avenue, New York, N. Y., heeding the admonition of the OTD against traveling the latter part of the year, determined to call in officers, directors and stockholders for a series of meetings to consider postwar planning, including recommendations for the enlargement of manufacturing facilities in both Chicago and Los Angeles. Moreover, in order to save another meeting requiring additional traveling, it was decided to hold the annual meeting for the election of officers at the same time. This culminated in a full meeting of the Board and of the stockholders on September 14 and 15 last.

In appreciation of the services rendered by David Lakritz, chief chemist of the corporation in the development of the organization's products, and Leonard Katz, in the development of the West Coast business, it was voted to amend the bylaws to create two additional vice-presidencies. One is to have charge of West Coast operations in conjunction with Dr. Alexander E. Katz and the other to have charge of all manufacturing operations.

Following the stockholders' meeting, the re-elected board of directors met and unanimously elected the following officers:

Alexander E. Katz, president; William Lakritz, executive vice-president; David Lakritz, vice-president; Leonard Katz, vice-president; Joseph H. Fein, treasurer; Charles P. Kramer, secretary; Charlotte F. Senior, assistant secretary and assistant treasurer.

A program to increase manufacturing facilities in the Mid-West and California was passed upon and plans were laid for the immediate undertaking of manufacturing on the West Coast to provide better facilities and quicker service to the corporation's many customers in that territory.

# Two New Members Added to Fritzsche Quarter Century Club

Fritzsche Brothers, Inc., 76 Ninth Ave., New York, N. Y., held a luncheon recently in honor of the two members who had just passed 25 years' continuous service with the company, and thus become members of the "Quarter of a Century Club." Emil Muller, assistant to the director of production, and John H. Haunss, head of the order department, were the honored guests. An interesting sidelight on the Club's membership is the fact that out of the twenty-three who have reached the qualifying years of service to date, eighteen are still active in the company and have been for a total of 607 years.

#### Baker Extract Co. Holds Sales Convention

Baker Extract Co., Springfield, Mass., held a three-day conference, attended by the company salesmen, on September 21, 22 and 23. The company, which was founded in Portland, Me., is 65 years old.

# Annual Meeting of Packaging Institute

The annual meeting of the Packaging Institute is to be held at the Hotel New Yorker, New York, N. Y., November 1 and 2.

#### "Carry Own Christmas Package" Campaign Launched

Because of the acute delivery problem with which they are faced, the Sales Promotion of the National Retail Dry Goods Association has launched a nation-wide poster campaign to induce Christmas shoppers to carry their own Christmas packages, thus easing the pressure on deliveries.

#### Sterling Drug Acquires James F. Ballard, Inc.

Sterling Drug Inc. has acquired the stock of James F. Ballard, Inc., St. Louis, manufacturers of Campho-Phenique, and other drug products. The transaction involved payment to Ballard's stockholders of 21,000 shares of Sterling stock. James F. Ballard, Inc., was incorporated in 1922, but its best known product, Campho-Phenique, was developed long before that time.

# WE AIM TO .... DIS-PLEASE REPELLENTS of all KINDS!

Nature's Traffic Cop and Field-Control Agent

RODENTS, RABBITS and DEER destroy much valuable Food and Stored Material needed for human consumption.

The SCARECROW was Man's earli-

An OUNCE of PREVENTATIVE is worth a POUND of CURE.

est REPELLENT.

By keeping the CAUSE away, you avoid the loss - before the DAMAGE

We specialize in being disagreeable to animal destroyers of crops, property and health. The more repugnant and terrifying we can be -the better pleased.

CONSULT us for SPOOKS, SPIRITS, HAUNTS and GHOSTS that Animals FEAR—and keep them away from prescribed territories.

Pest Control Dept.

Photo by Chas. V. Sparhawl



Raw Materials **Aromatic Chemicals Essential Oils Imports** 

Perfumery . Soap . Food . Flavors

Gerard J. Danco

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Cable Address CODAR, New York

Paper Boxes for the Cosmetic and allied trades . . . .

Present conditions preclude us from accepting any orders at the present time for immediate delivery.

Eugene K. Plumly Co.

Federal and Juniper Streets Philadelphia 47, Pa.

# Synthetic Organic Detergents Committee

A new Synthetic Organic Detergents Committee has been formed. Members are: N. A. Collins, Atlantic Refining Co.; Kenneth T. King, E. I. du Pont de Nemours & Co.; R. Lenz, General Dyestuff Corp.; George O. Richardson, National Aniline Division, Allied Chemical & Dye Corp.; Richard Von Oesen, Richards Chemical Works, Inc., and R. S. Wheaterly, Monsanto Chemical Co.

#### E. T. Browne Drug Co. Stipulation

E. T. Browne Drug Co., New York, N. Y., selling and distributing a cosmetic "Palmer's Skin Success Whitening Cream," represented as making dark skin lighter, have entered into a stipulation with the Federal Trade Commission in which they agree to stop advertising which does not reveal that the preparation should be applied only to a limited area at one time, too frequent applications should be avoided, that the preparation should not be used on cut or broken

skin, and that a patch test should be made; provided, however, that the advertising need contain "Caution: Use only as directed," if the directions on the label warn to this effect. It was further agreed that the company will not represent that the preparation will permanently whiten the skin.

#### T. C. Wheaton Co. Wins Third E Award

The T. C. Wheaton Co., Millville, N. J., which has been doing useful work in the manufacture of containers for blood plasma was recently given its third E award in recognition of outstanding service. The award was received on behalf of the company by Frank C. Wheaton, president.

#### "Sheen-Tone" Shampoo Introduced

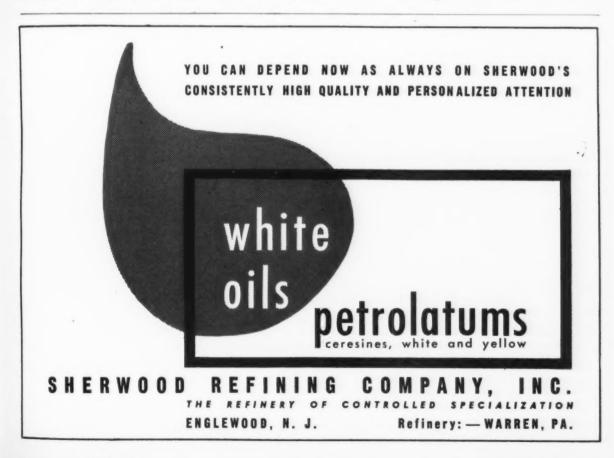
"Sheen-Tone," a new synthetic shampoo, has been introduced by Primrose House, New York, N. Y. This new product is available at \$1 for the  $3\frac{1}{2}$  oz. size.

#### Cosmetic Credit Men Resume Monthly Meetings

The Drug, Cosmetic & Chemical Credit Men's Association resumed its Winter schedule of monthly meetings, September 21 with E. Kavanagh, chairman, officiating. Numerous accounts were presented for discussion and clearance. The next meeting will be held at the Midston House, New York, N. Y., on October 26.

#### Burry Biscuit Corp. Breaks into Cosmetic Field

Burry Biscuit Corp., Elizabeth, N. J., is breaking into the drug field for the first time through the subsidiaries, Poly Clene Co., Inc., and Lucident Co., Inc. The two new companies will manufacture and distribute a denture cleaner "Lucident," a clay facial pack "Claray," and a household deodorant "Odokil." Distribution will be through drug, department, variety and syndicate stores, in addition to food outlets. George W. Burry will head the Poly Clene Co., and Samuel Lehrer is to be president of Lucidente.



# SORBOTEX 301

# A New Development in Absorption Base

#### WHAT IT IS

SORBOTEX 301 is a white, ointment-like odorless mixture of higher fatty alcohols and esters in a hydrocarbon base. It does not contain Ianolin. It is free from any tendency to eventually discolor the products in which it is used or to impart an undesirable odor to them. Its water absorption is substantially greater than that of absorption base containing either Ianolin or Ianolin isolates.

#### WHAT IT DOES

**SORBOTEX 301** makes white, stable water-in-oil emulsions. In the presence of an alkali, it is also a highly effective emulsifier and stabilizing agent for oil-in-water emulsions, an advantage offered by very few types of absorption base.

#### USES

**SORBOTEX 301** is applicable to night creams, cold cream, ointment bases, permanent wave preparations, etc. It can also be used as an extender for lanolin.

Suggested percentages: In water-in-oil emulsions, that is, creams having a high fatcontent, such as night creams, for instance, up to 25 per cent. In oil-in-water emulsions, that is, creams with a low oil-content, such as vanishing-type face and hand creams, up to 5 per cent. In permanent wave preparations, up to 2 per cent.

#### MAKE THIS TEST

Make a small batch of one of your creams, replacing the absorption base that you are now using with Sorbotex 301. Compare the cream containing Sorbotex 301 with that made with your present absorption base, as to appearance, texture, emollient effect, and stability. We will gladly supply the Sorbotex 301 required to make the test, without charge.

**SORBOTEX 301** is made of freely available raw material; it can therefore be supplied promptly in all quantities. Its price is attractive.

# VAN DYK & COMPANY

MANUFACTURERS OF PERFUMERY & COSMETIC RAW MATERIAL SINCE 1901.

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#### Betty Coed Cosmetics Co. Formed

A new cosmetic company to be known as Betty Coed Cosmetics Co. has been formed by David Berlinkoff, Sam Rosenberg and Betty Mandel. It will be located at 948 So. Santee St., Los Angeles, Calif.

#### Drug. Chemical & Allied Trades Growth

The DCAT Section of the New York Board of Trade has announced that for the first time in history its membership has passed the 500 mark. Over sixty of these firms have joined the organization within the past three

#### ADACIOM Golfers Close Season

Members of the Associated Drug and Chemical Industries of Missouri, Inc. closed the 1944 season with a tournament on the picturesque Sunset Country Club course at Sappington, St. Louis County, Missouri, Prize winners for the day were: Dick Reamer: J. F. Newhouse, Art Kroeger, Bill Van Alstyne, D. P. Murray and Jack Berkeley. Season prizes went to Doler Murray and Glenn O'Neal.

#### Chicago Perfumery, Soap & Extract Assn. Bowlers

The Bowling League season of the Chicago Perfumery, Soap and Extract Assn. was initiated September 12 in a Fall luncheon at the Bismarck Hotel. An instructive bowling movie was shown to help the beginners and to improve the technique of the experienced bowlers. Tournaments started October 5, at the Illinois Athletic Club, and will continue for 28 weeks.

#### Lever Brothers Receives Safety Award

Lever Brothers Co. received an award from the National Safety Council on September 25 for the safety devices it has installed in its plants, and for the care exercised by employees to avoid accidents. Cecil B. DeMille, producer and director of "Lux Radio Theatre" accepted the award in behalf of his sponsor.

#### Chicago Drug & Chemical Association's Fall Luncheon

The Chicago Drug & Chemical Association's first Fall luncheon meeting was held at the Drake Hotel on Thursday, September 28, in the Walton Room. The speaker was Donald McGibney, whose subject was, "What's Ahead in World Affairs."

#### New Members to **Toilet Goods Association**

The Toilet Goods Association has announced the addition of twentysix new members. Present membership is: active 297, associate 141, total 438.

#### Postwar Air Transport Luncheon

The Aviation Section of the New York Board of Trade gave a luncheon at the Hotel New Yorker, New York, N. Y., on October 12. A brief Forum was held. The luncheon was given in honor of the Delegates to the National Convention of the American Association of Port Authorities, Inc.

# PLYMOUTH WAXES CREAMS

This Spermaceti should not be confused with inferior hydrogenated sperm oils which are sometimes offered as Spermaceti The Plymouth Brand is the finest which can be produced and is produced from Genuine Sperm Oil by the cold pressing method. It is a very white crystalline wax containing no free oil. has a very low lodine number and is free of any offensive odors.

#### **PLYMOUTH Ozokerites**

We offer two grades One is the highest quality obtainable, 76°-78° C melting point and the other grade lower in price and of lower melting point 66°-68° C. Both are guaranteed 100% Pure Bleached Ozokerites.

#### PLYMOUTH Sun-bleached White Beeswax U.S.P.

This is guaranteed to be a 100% Pure Beeswax and sun-bleached It is refined by the centrifugal method which removes all and every trace of foreign matter: We will gladly send samples.

#### PLYMOUTH White Cirine Wax

A special grade of White Ceresin Wax prepared for the cosmetic trade Absolutely white and odorless. It has a melting point corresponding to that of Beeswax so that in using it in connection with Beeswax in cream any "lumpiness" is avoided. Its use will also produce a very glossy cream.

We offer all grades of the U S.P fully-refined Paraffin Waxes.

## COMPLETE LINE OF COSMETIC RAW MATERIALS M. W. PARSONS

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Imports Telephone. BEEKMAN 3-3162-3163-3164 and PLYMOUTH ORGANIC LABORATORIES, Inc. Cable Address. PARSONOILS, NEW YORK

# **B-W LANOLIN U.S.P.**

## EVENTUALLY—For better creams, with economy

B-W Lanolin the superior quality puts into your cream that which gives the skin that smooth soft velvety feeling.

B-W Lanolin will never cause your cream to darken, is best by test and contains over 15% free and combined Cholesterol.

No other base used in your cream, equals the merits of B-W Lanolin.

B-W HYDROPHIL (Absorption Base) Made in U.S.A.

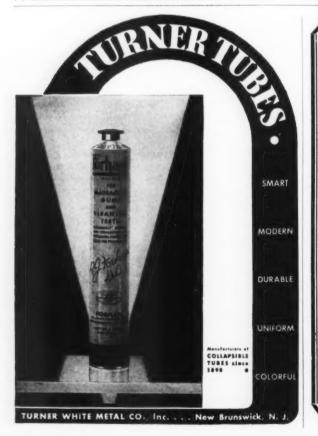
### **BOPF-WHITTAM CORPORATION**

Executive Office Laboratory and Factory

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America's Original Lanolin Producer ESTABLISHED 1914 Sales Office 509 Fifth Ave.

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# Isopropyl Alcohol

Permanently deodorized and purified

by us

by means of a special chemical process removing the factors responsible for the eventual deterioration of essential oils in plain or masked Isopropyl Alcohol

Blends beautifully with the most delicate perfumes

#### **INEXPENSIVE**

Samples and information on request

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Ironsides 6-9499

# Easing of Regulations Expected on V-E Day

It is confidently expected that regulations will be eased radically on V-E Day. Of the some 500 orders now in effect through WPB some 300 are expected to be dropped outright, and of those remaining the system will be simplified.

# McKesson & Robbins Statement

McKesson & Robbins, Bridgeport, Conn., reported a net income of \$5,-161,069 for the fiscal year ending June 30, 1944. This is equivalent to \$2.75 a common share. Net sales for the year were \$279,194,622.

#### Keystone Laboratories Stipulation Amended

The stipulation of Keystone Laboratories, Memphis, Tenn., engaged in the sale of toilet goods, cosmetics, and other merchandise, has been amended by striking out a paragraph in which the respondent agreed to stop: "Representing that any article is given 'free' when receipt of such article is contingent upon consideration, terms or conditions, as payment of money, or rendering services," and substituting the words "Representing that any article of merchandise is 'free', 'given free' or without cost to the recipient when such article is not a gratuity, and the prospective recipient is required as a consideration to purchase some other article or articles or render some service in order to obtain the same."

#### First Course in Marketing Cosmetics Attracts 40 Students

The first university course on the merchandising of drug and cosmetic products offered by the School of Commerce, Accounts and Finance of New York University, New York, N. Y., held its first session on the evening of October 2. The course is conducted by Sidney Picker and Prof. Louis Bader, associate professor of marketing. The registration numbered 40 serious minded students some of whom have had many years of experience in the industry.

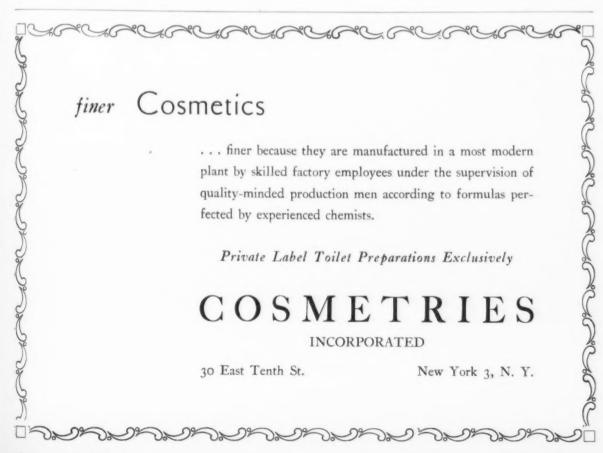
# Chicago Perfumery, Soap & Extract Assn. Golf Meet

The Chicago Perfumery, Soap & Extract Assn. Golf Tournament wound up the season by holding its final tournament at the Westward-Ho Country Club, September 22, followed by its customary annual dinner.

All golfers received prizes by drawings rather than in the usual way, based on the lowest scores. Following the presentation of the prizes, highspots of the various annual tournaments back to 1936 were shown by movies. Attendance was better than that of previous years.

# Spanish Olive Oil Imports Delayed

The 3,000 tons of olive oil which the Spanish Government has agreed to release for export to this country have been delayed owing to the failure of that Government to set an export price. The shipments are to be handled by private channels. The Department of State is taking steps to seek a solution to the problem.



## REPLACEMENTS

For AROMATIC CHEMICALS ESSENTIAL SPICE and

FLOWER OILS

SOAP PERFUMES ODOR MASKS

# SEELEY & CO.

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FACTORIES

FARMINGDALE, L. I., N. Y.

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# YOUR

You built this laboratory. We started with small capital, much skill and an overmastering ambition to produce super-fine cosmetics.

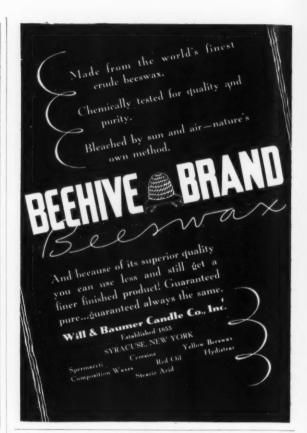
Your recognition of our integrity and accomplishment gave us stability. The structure you helped rear is best proof that "how good" is a far finer standard than "how much".

Why not write NOW (on your business letterhead) for sample Kelton Lipstick, Rouge, Powder, Eyeshadow? There is no obligation to do more than test them. They have stood the test for years.

# **KELTON**

Cosmetic Company

230 West 17th Street, 819 Santee Street, New York 11, New York. Los Angeles 14, Calit. Lipstick • Eyeshadow • Ronge • Mascara • Powder









# CONSOLIDATED

Established 1858 FRUIT JAR CO. NEW BRUNSWICK, NEW JERSEY

SHEET METAL GOODS : CORK TOPS : SPRINKLER TOPS : DOSE CAPS

# 3 NEW WHITE SACHET FILLERS

Made in fine ground wood powder—NEUTRAL COLOR.

Fine ground aromatic red cedar powder. Also finely ground mineral dust.

Highly absorbent, retains scent,
Above grades are now being used in the cosmetic industry.
Always uniform—prompt shipment—no priorities needed.

Sawdust for other purposes-special fine and coarse grades.

Ask for samples

Cosmetic Materials Division

NATIONAL SAWDUST CO. INC.

76 North 6th Street

Brooklyn 11, N. Y.

#### A. T. & T. Sponsors Fellowships in Physics

The American Telephone and Telegraph Co., New York, N. Y., has established a trust fund to finance five fellowships annually in physical science. The awards are to be known as the Frank B. Jewett Fellowships, and provide an annual honorarium of \$3,000 to the holder and \$1,500 to the institution chosen for research. Recipients will be chosen by members of the staff of Bell Telephone Laboratories. The awards will be made for "demonstrated research ability."

#### Baekeland Award Established

The establishment of the Leo Hendrik Baekeland award, which was instituted with the cooperation of the Bakelite Corp., New York, N. Y., was announced at the 108th meeting of the American Chemical Society. The first presentation of the award, which will consist of \$1,000 and a gold medal suitably inscribed, will be made during May, 1945. The award will be made biennially to an Ameri-

can chemist who has not yet reached his fortieth year, in recognition of accomplishments in pure or industrial chemistry.

#### Tangee Seeks Broad Infringement

The George W. Luft Co., Long Island City, N. Y., manufacturer of "Tangee," has asked the U. S. Supreme Court to review a decision of the circuit court of appeals of New York, involving infringement of the Tangee trademark. The former finding was that the Tangee trademark was being infringed by Zande Cosmetic Co. and Aristides Tsirkas, New York, N. Y., and provided an injunction and an accounting of damages. The finding applied to domestic business, and to certain foreign countries, but not to others.

#### Boston BIMS Announce Last 1944 Golf Party

The BIMS of Boston have scheduled their last 1944 golf party for October 18. It is to be held at the Charles River Country Club. A larger than usual attendance is expected.

#### Merck & Co. Report Income

Merck & Co., Rahway, N. J., reports that, with its subsidiaries, a net income of \$1,337,585 has resulted during the six months ended June 30, 1944. This is equal to \$1.09 a share on outstanding common stock. The net income for the corresponding period in 1943 was \$2,106,126. Net sales for the first six months in 1944 were \$27,368,973, as compared to \$30,586,960 for the first half of last year.

#### Fat Salvage Is On the Upswing

More than 233,500,000 pounds of used cooking fats have been turned in by civilians up to July 31, 1944, according to the annual report on fat salvage submitted by the American Fat Salvage Committee, Inc. In addition 122,900,000 pounds of fat were salvaged by the armed forces.

During the first seven months of 1944 civilian fat salvage averaged over 16,000,000 pounds a month as compared to the average of 7,455,000 pounds for equivalent 1943 period.

# René Forster Company

Fine Aromatic Chemicals

Essential Oils Specialties

404 Fourth Ave. New York 16, N.Y.

Murray Hill 5-0250

### Obituary

#### George L. Ringel

George L. Ringel, vice-president and director of Fritzsche Brothers, Inc., Nev York, N. Y., passed away



George L. Ringel

on Tuesday, October 3, 1944, at the Mount Carmel Hospital, Columbus, Ohio, where he was being treated for a heart ailment. Born in Cincinnati, Ohio, on August 29, 1878, he was 66 years of age and at the

time of his death had been with the Fritzsche organization nearly 44 years, having joined the firm on February 11, 1901, shortly after completion of his studies at the Cincinnati College of Pharmacy. Through his efforts as representative covering Ohio and adjacent territories and later as manager of Eastern sales which brought him in contact with customers throughout the entire East-

ern seaboard, and in Canada as manager of Fritzsche Brothers of Canada, Ltd., the firm's prestige and sales in these territories mounted steadily year after year. The friends he made throughout the various trades in which he continued active until the very last, were cherished by him as one of the happiest increments of his long and useful career. His personality and solid integrity won him countless friendships, not only among customers but among competitors who respected the honesty and fairness of his salesmanship.

Mr. Ringel was a member of the Ohio Volunteer Cavalry of Spanish American War Veterans, also of the Rotary Club of Columbus, the Columbus Country Club, the Columbus Athletic Club, the U. S. Senior Golf Association, the Ohio Society of New York and various Masonic bodies in addition to The Shrine. He was also a life member of the South Atlantic and Southern Drug Clubs as well as various trade associations throughout the country.

He is survived by his widow, Mrs. Helen J. Ringel of Columbus; a brother, William M. Ringel of Amelia, Ohio, and a sister, Mrs. Joseph Be Coursey of Santa Ana, California. Services were held at the Schoedinger Funeral Home, 229 East State Street, Columbus, Ohio, October 5.

#### Pellegrino Bonfiglio

Pellegrino Bonfiglio, retired soap and olive oil manufacturer, died September 12 in Los Angeles, Calif. He was seventy-four years of age.

#### Lawrence C. Minor

Lawrence C. Minor, who had been a sales executive in the glycerine and red oil department of Procter & Gamble Co. for 26 years died recently. He was 65 years of age.

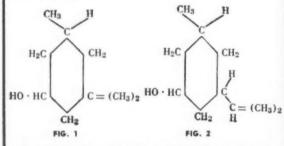
#### William J. Trevillian

William J. Trevillian, for many years executive vice-president of W. T. Rawleigh Co. died in Freeport, Ill. August 28. Mr. Trevillian was a member of the Illinois Pure Food Commission.

# CYCLONOL

# CHARACTERISTIC ODOR and COOLING EFFECT OF MENTHOL

Cyclonol is chemically 1-methyl-3-dimethyl-cyclohexanol-(5). Graphically the structural formula is given in Fig. 1. It may be considered a lower homologue of symmetric or meta Menthol which has the structural formula shown in Fig. 2.



Cyclonol replaces Menthol satisfactorily in shaving creams and lotions, liniments, analgesic balms, ointments and similar preparations. It has also been accepted by the U. S. Treasury Department as a Denaturant for alcohol in place of Menthol U.S.P.

## W. J. BUSH & CO., INC.

LICENSED DISTRIBUTORS

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# THIOGLYCOLATE

COLD Permanent Wave Solution

. . . AS YOU WANT IT!

Here is a cold wave ingredient that is clear and free from discoloration. Buffered to reduce skin sensitivity—ammonia sealed in—alkalinity precisely balanced and free from disagreeable odor.

If you have any special problems, we will cheerfully advise you as to your requirements. Are your plant and packaging facilities limited? Do you prefer ready-to-use material . . . or a higher concentration? Let us help you. WRITE TO US TODAY — FOR FREE SAMPLES AND OUR INFORMATIVE LITERATURE!



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# Manufacturers of

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#### ABSORPTION BASES

for PHARMACEUTICAL and **COSMETIC** preparations

Our Absorption Bases possess inherent emollient and absorption properties because of their high free Cholesterol content.

- OlesterOl Content.

   Facilitate the penetration and absorption of incorporated therapeutic agents.

   Recommended for case of emulsification.

   Absorb unusually large amounts of water.

   Form pure white water-in-oil emulsions, completely stable under widely varied conditions.

   Form elegant products of rich texture and consistency.

We also manufacture-

Cholesterol C. P., Emulsifiers, Ointment Bases, Industrial Penetrants, Softening and Dispersing Agents, and other Amerchal Products.

AMERCHOL products are manufactured from specially processed Cholesterol and other sterols.

- Will not oxidize, nor turn rancid.
   Are unaffected by electrolytes.
   Retain their properties at extreme temperatures.
   Are for neutral, acid and alkaline creams, ointments and lotions.

#### American Cholesterol Products

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# BOTTLES

Glass Stoppered Perfume and Toilet Water Bottles

Attractive Designs

## LEART COMPANY

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BASIC MATERIALS



BASIC

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## **BUSH AROMATICS**

INCORPORATED

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Many years ago we first offered fine paper boxes to cosmetic manufacturers. It is significant that since then most of the concerns with whom we began business still call upon us to meet their needs.

Despite the shortage of raw materials it is our pledge never to depart from the high standard of quality that has always been identified with KARL VOSS paper boxes.

There is no finer cosmetic container than a KARL VOSS box.

KARL VOSS CORPORATION

HOBOKEN

NEW JERSEY



# Price Changes in the Market and Their Causes

BUSINESS generally continued to be influenced by the war news and by the uncertainty with regard to the outcome of the election at home. Government regulations also served to retard business. Concern is expressed regarding the extension of regulations following the ending of the war in Europe, which would, in the opinion of many in the trade. make reconversion more complicated and difficult.

#### CEYLON CITRONELLA OIL

Price-wise, markets proved highly interesting in the light of a complete reversal in the trend of Ceylon citronella oil, a rather sharp break in glycerine, and the return of vanilla bean prices to maximum OPA levels. Stearic acid demand has continued brisk despite the recent readjustment

in quotations to ceilings.

The lanolin situation continued extremely tight. Increased military demands arising directly out of the successful prosecution of the European phase of the war have made it impossible to allocate any lanolin for cosmetic uses for September and October, it was officially learned. It is still a question whether any can be allocated for November or December. Cosmetic manufacturers have been allocated approximately 150.-000 pounds for each two-month period beginning with April-May.

While considerable interest has been shown in mint oils with distillation of the new crop well under way, trade in both articles (spearmint and peppermint) has remained virtually at a standstill in the local market where dealers having had low price ceilings imposed, find that it is impossible to pay country prices and resell the oils at a profit. Some houses maintain that transactions in these oils under the present price scheme would mean a loss.

Bureau of Agricultural Economics. Department of Agriculture, declares that indicated production of peppermint oil for the current crop is 38 per cent higher than that of 1943 and 9 per cent over the eight-year average (1935-42). The increase over the August estimate was reported caused by the rise in Indiana. Oregon and Washington yields, Prospeets for Michigan, Ohio and California remain unchanged.

#### GLYCERINE PRICES READJUSTED

Readjustment of glycerine prices was made for the purpose of bringing prices for processed material more closely into line with what refiners have been paying for crude and saponification. The reduction was far sharper than the extent of a normal fluctuation in prices and it is felt that the new and lower prices will hold unless the crude market shall deteriorate further. From the demand side of the market there has been a fair tonnage purchased by the Army for the purposes of shipping the goods to Russia under the lend-lease program.

The late advance in Ceylon citronella oil was attributed to reports of good-size orders having been placed in the primary center for the account of Great Britain. According to reports at least two tons changed hands in the spot market for the account of dealers. While little or no eucalyptus oil has been available from the primary center for some time, it is understood that offerings have reached this market from Great Britain. Lemongrass remains firm on spot and for shipment.

Various estimates have been made concerning the new mint crop in Brazil and the total amount of menthol that is expected to be produced. It has been said that the 1945 mint acreage will be four times as large as that of 1944, provided the weather will be favorable during the next three months. Last year's crop was estimated at about 150 tons, but it is now believed that the next crop will be nearly 600 tons.

Some local houses reported the demand for menthol as quiet, but such reports were discounted and were regarded as efforts to bear the market. With little hope of obtaining any extension in ceiling prices, and since maximum sales prices here have been too close to replacement costs on the last crop, it is quite likely every effort will be made to force prices lower in Brazil.

Many large consumers had covered their requirements some time ago. With the heavy consuming season about at hand, however, additional inquiries are reaching the market from smaller users.

Prices on ribbon tragacanth were reduced to stimulate buying.

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S. P. A 4.75@ 5.10	Java 3.25	Nom'l	Orange, bitter	4.00@ 4.25
	Cloves, Zanzibar 1.80@	1.85	Brazilian	1.25@ 1.40
Sweet True 1.50@ 1.75	Copaiba	Nom'l	Calif., exp.	1.75@
Apricot Kernel	Coriander 30.00@	32.00	Orris Root, abs. (oz.)	35.00@
Amber, rectified 2.25 Nom'l	Imitation 12.00@	14.00	Artificial	36.00@ 40.00
Angelica Root	Croton 3.756	4.00	Pennyroval, Amer.	4.00@ 4.10
Anise, U. S. P. 4.00 Nom'l	Cubebs 5.25	Nom'l	European	4.00 Nom'l
Imitation	Cumin 8.50@	00.11 @	Peppermint, natural	7.50@
Aspic (spike) Span 3.75@ 4.00	Dillseed 5.50	Nom'l	Redistilled	8.05@
Avocado 1.05@ 1.25	Erigeron 2.25@	5.00	Petitgrain	1.70@ 2.00
Bay 1.45@ 1.70	Eucalyptus 1.55			5,25@ 8.00
Bergamot	Fonnel, Sweet 4.00		Pinus Sylvestris	4.25@ 5.00
Brazilian 10.00@ 10.25	Geranium, Rose, Algerian 15.000		Pumillonis	4.25 Nom'l
Artificial 4.00@ 9.25	Bourbon 13.000			25.00@ 32.00
Birch, sweet 3.35@ 5.25	Turkish 5.000			45.00@ 55.00
Birchtar, crude 2.25 Nom'l	Ginger		Rosemary, Spanish	2.00@ 2.10
Birchtar, rectified 4.25 Nom'l	Guaige (Wood) 4.000		Sage	5.85@ 6.50
Bois de Rose 5.10@ 5.35	Hemlock 1.50			35.00 Nom'l
Cade, N. S. P	Substitute .550		Sandalwood, East India	7.00 Nom'l
Cajeput 2.25@ 3.00			Sassafras, natural	2.00@ 2.15
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Celery	Neroli, Bigarde P. 300.000			28.00@ 32.00
Chamomile 150.00 Nom'l	Petale, extra		[Continued on page	
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C 11 22.00 No C 12 25.00@ 31 C 14 (so called) 9.25@ C C 16 (so called) 7.05@ Amyl Acetate 50@ Amyl Butyrate 90@ Amyl Cinnamate 4.50@ Amyl Cinnamate 1.25@ Amyl Formate 1.25@ Amyl Formate 1.25@ Amyl Formate 3.75@ Amyl Formate 9.85@ Amyl Valerate 2.10@ Anethol 2.75@ Anethol 2.75@ Benzophenone 1.15@ Benzophenone 1.15@		Nom'
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Amyl     Acetate     .50@       Amyl     Butyrate     .90@       Amyl     Cinnamate     .450@       Amyl     Cinnamate     1.25@       Amyl     Formate     1.25@       Amyl     Phenyl     Acetate     .375@       Amyl     Salicylate     .95@       Amyl     Valerate     2.10@       Anethol     2.75@       Anisic     Aldehyde     3.15@       Benzophenone     1.15@	C 14 (so called) 9.25@	9.75
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Ethyl Formate	.65@ 1.00
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Benzyl-Iso-eugenol	10.25 Nom'l	Iso-butyl Salicylate 2.70@ 3.00
Benzylidenacetone	2.25@ 3.40	Iso-eugenol 4.00@ 4.85
Borneol	1.80 Nom'l	Iso-safrol 3.00 Nom'l
Bornyl Acetate	2.00 Nom'l	Linglool 7.50@ 8.00
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Cinnamyl Butyrate	12.00@ 14.00	Methyl Anthranilate 2.75@ 3.00
Cinnamyl Formate	10.00@ 13.00	Methyl Benzoate
Citral, C. P.	3.80@ 4.00	Methyl Cellulose, f.o.b, ship-
Citronellol	6.50@ 7.00	ping point
Citronellyl Acetate	8.60@ 9.20	Methyl Cinnamate 2.50@ 3.75
Coumarin		Methyl Eugenol
Cuminic Aldehyde	8.00@ 11.25	Methyl Heptenone 3.50 Nom'l
Diethylphthalate	.24 Nom'l	Methyl Heptine Carbonate. 40.00@ 60.00
Dimethyl Anthranilate	4.55@ 5.00	Methyl Iso-eugenol 5.85@ 10.00
Ethyl Acetate	.25 Nom'l	Methyl Octine Carbonate 24.00@ 30.00
Ethyl Anthranilate		Methyl Paracresol 2.50 Nom'l
Ethyl Benzoate		Methyl Phenylacetate 3.75@ 4.00
Ethyl Butyrate		Methyl Salicylate
Ethyl Cinnamate		Musk Ambrette 9.50 Nom'l
Ethyl Formate		Ketone 4.50@ 9.70
Ethyl Propionate		Xylene 1.65@ 2.50
Ethyl Salicylate		Neroline (ethyl ether) 2.00@ 3.15
Ethyl Vanillin		Paracresol Acetate 2.55@ 3.00
Eucalyptol		Paracresol Methyl Ether 2.60 Nom'l
Eugenol		Paracresol Phenyl-acetate 6.50@ 8.50
Geraniol, dom		Phenylacetaldehyde 50% 3.00@ 3.35
Geranyl Acetate		100% 4.50@ 5.00
Geranyl Butyrate		Phenylacetic Acid 3.00@ 3.75
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Triple Pressed	.18%@	.187/8
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# Production Control and the Analysis of Cosmetics

by MAISON G. DENAVARRE, Ph.C., B.S.

Technical Editor of the American Perfumer & Essential Oil Review and of Elaboraciones y Envases, Special Lecturer in Cosmetics, Wayne University, College of Pharmacy, Consulting Chemist

#### Eighth Installment

The seventh installment was published in the preceding issue. Subsequent installments will appear in forthcoming issues.

#### ACKNOWLEDGMENTS

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#### CHAPTER IV

(continued)

### Physical and Chemical Testing Gravimetric and Volumetric Methods

#### P-101-REFRACTIVE INDEX WITH FISHER REFRACTOMETER

Ranging from 1.30 to 1.90

The instrument, Figure 101, employs a unique, illuminated scale and a sample holder which requires only 0.001 ml of the material to be tested. A lamp in the well-ventilated housing casts a beam of light through a slit in the scale, then through a 2-mm aperture to the eye. Over this aperture is a fixed glass plate with plane parallel faces. A small glass slide with a beveled edge is mounted on the glass plate so that a prism-shaped well is formed between the plate and the slide. When a drop of the sample is placed in this well, the liquid covers part of the aperture so that a clear image of the scale is seen and also, a secondary or virtual image caused by refraction of the light passing through the prism of liquid sample.

The refractive index of the sample is read directly from the scale which is graduated from N=1.30 to N=1.90 with subdivisions of .01. The length of the scale,  $5\frac{1}{2}$  inches, permits easy estimation of the index to N=.002, which is the sensitivity of the instrument.

#### P-102-REFRACTIVE INDEX (FOR LIQUIDS)

(U.S.P.)

The refractive index (N) of a transparent substance is the ratio of the velocity of light in air to its velocity in that material under like conditions. It is equal to the ratio of the sine of the angle of incidence made by a ray in air to the sine of the angle of refraction made by the ray in the material being tested. This physical constant is used as a means for identification of, and detection of impurities

in, volatile oils. The Abbé refractometer (Figure 8) measures the range of indices of the Pharmacopoeial materials

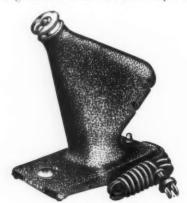


Figure 101. Fisher Refractometer

for which these values are given. Other refractometers of equal or greater accuracy may be employed at the discretion of the operator.

#### P-103-RESISTANCE TO CHANGE IN TEMPERATURE

Apply the nail enamel to any of the following surfaces: plate glass, plastic sheets or cow's hoof. Air dry for 30 minutes. Place in water maintained at a temperature of 120 to 130° F for 15 minutes, remove and chill in ice water for 15 minutes. Repeat the cycle several times. Rinse and dry, then note any imperfections such as poor adhesion, cracking or checking of the applied film.

#### P-104-SEDIMENTATION

(Snow Top Chalk Method)

Settling tests in precipitated chalks form an indication of particle size and wet bulk. The sedimentation of Snow Top chalks is repeatedly checked for every plant run, and each shipment is made to conform to very narrow limits in order to insure the utmost in uniformity of physical properties.

The procedure in testing for sedimentation is to weigh out 10 grams of the sample in a 100 cc. graduate filled to the mark with distilled water and shake vigorously for two minutes after stoppering. The rate of settling is then observed at the end of two hours, and after 24 hours a reading regarded as final is taken.

#### P-105-SERIAL NUMBERING LABELS

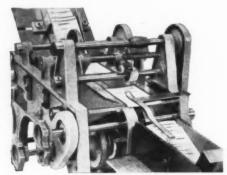
(Courtesy New Jersey Machine Corp.)

Labels are stacked in a hopper and the friction type feed wheel automatically separates the top label from the stack so that it can be conveyed through the machine. The label is carried through the equipment by a continuously running chain. The control numbers are set in a chase and automatically inked from a felt pad. They print on the label as it passes underneath them. The labels are then ejected and automatically stacked. (Figure 102.)

The Code-O-Matic Printer can handle rectangular labels from  $1 \times 2''$  up to  $6 \times 8''$ . Provision is made for quick adjustment to handle different label sizes and changes in the control numbers. This equipment will operate up to 250 per minute.

Varnished and lacquered labels can be imprinted by employing special inks.

Many firms find it advantageous to put the control number on the back of the label so as not to interfere with the printed material on the face. This method is effective particularly when the contents of the container are transparent, and as a means of checking back in the case of a customer's complaint.



Courtesy, New Jersey Machine Co. Figure 102. Serial Numbering Machine

#### P-106-SETTLING RATE

After the mixed batch has aged for 2 days, thoroughly remix a quantity and, while mixing, pour into four bottles and seal.

Place two of the bottles on the shelf. Put the remaining two bottles on a vibrating platform as in P-34. After 30 minutes and 12 hours note degree of settling and compare with standard or control sample treated in exactly the same manner.

This test will often indicate whether the correct amount of solids is present, but it should not be used as a positive guide of solids content. (Figure 103.)



Figure 103. Settling Rate

#### P-107-SLIPPING POINT

(A.O.C.S.)

(Modified Bailey-Whitner method for lard, lard substitutes, butter, margarine, emulsions, and fatty products in their natural or prepared state; Cotton Oil Press, 5, No. 10, 30 (1922)

Apparatus. Titer thermometer.

Melting point cups made of brass cylinders, medium walls, 1 cm (\(^{3}\)\sigma\$ inch) diameter x 1 cm high, soldered to a brass or copper spiral and bent so that they may be attached to a titer thermometer.

Beaker, 600-cc.

Heating apparatus. Tripod and burner, or other suitable apparatus.

Determination. Fill the cups with the sample just as taken from the package by forcing the material into them from the bottom until the plug of fat projects above the top of the cup. Cut off the excess so that the cup is completely filled. Take care that none of the sample is smeared around the bottom or top of the cup and that the cup is solidly packed. Attach two or more of the cups to the titer thermometer in such a way that they will hang opposite the bulb of the thermometer and in close proximity to it. Suspend the thermometer in a saturated salt solution in the 600-cc beaker to a depth of 8 cm (3 inches). Heat the bath at the rate of 1° C per minute with constant agitation with air or by mechanical means, slowing down the heating toward the last to 0.5 C per minute. The thermometer is read when the fat rises from the cup and the temperature is recorded as the slipping point.

This method, devised by Bailey and Whitner in the laboratory of the Southern Cotton Oil Company, of Savannah, gives excellent results on manufactured fatty products in the form of emulsions and mixtures which have been beaten up with air or water, such as butter, margarine, lard, compound, etc. It applies equally well to lard, tallow, or any manufactured product of a fatty nature as manufactured, since it measures the slipping point of the product as it exists rather than a constant of the fat itself. Properly manipulated it is very accurate, yielding results that agree within ±0.2° C. Since the slipping point varies according to the manipulation of the product, it is difficult to reproduce in the laboratory the conditions of manipulation of a given sample sufficiently well to obtain the same slipping point after the sample has been melted or modified. In all cases, therefore, it is necessary to work on the original sample.

#### P-108-SOAPY WATER SENSITIVITY

Apply the nail enamel to a clean, uniform surface of a cow's hoof. Allow to dry in ordinary air for at least a half hour. Immerse completely in a beaker of ½ to 1% soap solution, maintained at a temperature of 120 to 130° F, or any arbitrary temperature, for 3 hours. Remove hoof, rinse and dry. Observe for blushing, blisters, fading or other imperfections. Sometimes this test is conducted over a period of 24 hours and in the presence of salt with or without added alkali such as TSP.

#### P-109-SOFTENING POINT

(A.O.C.S.)

(Open-tube melting point for fats solid at ordinary temperatures)

Apparatus. Straight capillary tubes made from tubing of 1 mm inside diameter of medium wall. Length of tube, 7.5 cm.

Standard titer thermometer graduated to 0.1  $^{\circ}$  C. Beaker, 600-cc.

Burner or electrical heating apparatus.

Determination. Melt the sample and mix thoroughly. Dip three capillary tubes, described above, in the oil or fat so that the fat in the tubes stands about 1 cm high. Chill the fat at once by means of ice and place in a tight

container, pack in ice, and hold at this temperature overnight.

Fasten the tubes with a rubber band or other suitable means to the bulb of the titer thermometer graduated in tenths of degrees. Suspend the thermometer in a beaker of water (agitated by means of air) so that the bottom of the bulb is submerged about 3 cm. The temperature of the water should be about 10° C lower than the expected softening point. Raise the temperature of the water gradually at the rate of about 1° C per minute at first, slowing down to 0.5° C per minute as the softening point is approached. The temperature at which the column of fat rises in the capillary tube is taken as the softening point of the sample.

of the sample.

Note. This method is of limited application and definite knowledge of its limitations is required for its satisfactory use. A fat or fat mixture does not have a sharply

defined softening point comparable with the melting point of a pure substance. In the hands of different operators the method yields good results  $(\pm 0.3^{\circ} \text{ C})$  when applied to such fats as coconut oil, stearins, hard hydrogenized fats, hard tallows, and other homogeneous fatty substances; less satisfactory results  $(\pm 2^{\circ} \text{ C})$  on lard, soft tallows, grease, and similar fats; and is quite unusable on lard compounds or mixtures of hard and soft fatty substances and emulsions (range  $\pm 5^{\circ} \text{ C}$  or more). The Bailey-Whit-

ner method is recommended for these.

In order to arrive at a knowledge of the lower temperature at which a fat softens or becomes sufficiently fluid to slip or run, many methods have been devised. Most of these have been considered by the Committee and three of them have been adopted, each serving a definite purpose. These are the softening point or open-tube melting point, the slipping point and the flow test. The softening point or open-tube melting point applies especially to pure fatty substances of higher melting point and is not applicable to lard compound or emulsions.

#### P-110-SOFTENING POINT

(Fisher Method)

SOFTENING POINT APPARATUS (Fisher) for determining the temperature where greases soften and "flow"; also used for the melting point of petrolatum and other

heavy petroleum products, was originally described in "The Laboratory,"

Volume II, Number 3.

The bath jacket is a modified Thiele form unit which should be filled with glycerine, sulfuric acid or other high boiling point liquid. The inner jacket forms an air bath around the thermometer and sample tube.

The sample should be rolled into a layer about ¼ inch thick and then the sample tube, which is ½ inch inside diameter, should be pressed into the rolled sample so that a small pellet is forced into the tube. Two inches of mercury should then be placed above the sample.

When the air temperature within the air bath reaches the softening point of the sample, the sample, under the





pressure of the mercury, drops from the tube and is caught by the small cup just below it. This prevents the sample

from adhering to the air bath.

The apparatus, Figure 104, supplied under this number consists of the outer jacket, inner jacket, cup and support, sample tube and rubber stoppers. No thermometers or mercury are supplied. All glass parts are made of pyrex glass.

#### P-111-SOFTENING-POINT OF FATS

(C. R. Barnicoat, The Analyst 69, 176-7, 1944)

Put 0.5 ml of mercury in a thin-walled (5 x 1 cm external diameter) lipped test-tube, and cool the tube and contents for some minutes in finely cracked ice and water. Above the mercury introduce 1 ml of melted fat; this rapidly solidifies, but leave the tube in the ice-water for about 30 minutes longer, and then, preferably in a refrigerator,

For the actual softening-point determination, all that is required is a large beaker of water, a thermometer, to which is attached a metal plate with a number of holes (we use 8), in which the tubes of fat are suspended by the lips. Place a 1/8 inch ball-bearing in each tube on the fat, in the depression which always forms when the fat cools. The fat column must be level with the thermometer bulb. Immerse the tubes in water at about 20° C for 30 minutes, and then raise the bath temperature at the rate of 0.5° C per minute, the water in the bath being stirred vigorously by means of air current. Within a degree or two of the softening-point the fat begins to clear, and the temperature is recorded when the ball-bearing has fallen half-way through the fat column. At this temperature the fat will not be quite clear. Actually, the temperaturerange from the beginning to end of the passage of the ball-bearing through the fat-layer is less than 1° C. Between workers, independently determined duplicate tests should not vary by more than 0.2° C, and the agreement is usually closer.

Experiments to determine the relative importance of the manipulations shows that the rate of heating must follow the standard conditions outlined; cooling over long periods does not affect the results; oxidation of fats lowers the softening point; too rapid or too slow cooling also gives low softening points. The method is most useful for mixtures rather than pure compounds with sharp melting points.

#### P-112-SOFTENING POINT

(Ring and Ball Method)

According to A. S. T. M. specifications (D36 and E28), the softening of bituminous materials generally takes place at no definite moment or temperature. As the temperature rises, they gradually and imperceptibly change from brittle or exceedingly thick and slow flowing materials to softer and less viscous liquids. For this reason the determination of the softening point must be made by a fixed, arbitrary and closely defined method if the results obtained are to be comparable.

The softening point, as determined by the ring and ball wet method, Figure 104-A, may be regarded as the temperature at which the sample of bituminous material has dropped a definite distance, when heated under prescribed conditions and carried down by a steel ball of specified

diameter and weight. The limit of accuracy of the test is plus or minus 0.9° F.

This method is very suitable for checking the softening point of lipsticks and other solid cosmetics or fats.



#### P-113-SOIL REMOVAL FROM SKIN

(O.Q.M.G. No. 100A-January 18, 1944) (Tentative Specification)

F-5. Wash the hands thoroughly, using the soap to be tested and tap water, and then dry thoroughly. Rub (with tip of one finger) 0.3 ml (3 drops) summer-grade 600-W gear oil into the skin on back of one hand only. Test efficiency of soap by washing in 250 ml water in 8-inch evaporating dish as follows:

(a) Apply soap to soiled area by 30-second rubbing

with soap bar

(b) Continue emulsifying action by rubbing with other hand (without bar) another 30 seconds, using both lengthwise and crosswise strokes

30-second rinsing

(d) Dry the skin by blotting with towel

Make three such determinations for each product for both (a) soft water (not over 10 grains hardness) and (b) synthetic sea water (F-3c). Complete removal of oil and stain by each washing is required. Product shall foam sufficiently to lubricate hands properly during cleaning and rinsing process.

#### P-114-SOIL REMOVAL FROM SOILED SWATCHES

(O.Q.M.G. No. 100A-January 18, 1944) (Tentative Specification)

H-3. The following test is also made by the Quartermaster Corps to ascertain approval of the finished product. Discrepancies inherent in this test procedure make it advisable to use the test as a guide only; it is highly desirable, but not mandatory, that manufacturers' laboratories show results consistent with the indicated performance range.

H-3a. PREPARATION OF SOILED SWATCHES. Raw white, uncarbonized worsted cloth (Botany-Worsted Mills Style No. 404 is suitable), conditioned 4 hours at 65% R. H. and 21° C, shall be uniformly soiled by immersing in the soiling solution and passing through a wringer under heavy pressure, repeating the process until the dried cloth has a reflectance of  $30\ (\pm 3.0)$  percent. The soiled cloth is then dried at  $100^\circ$  C for 1 hour. Soiled cloth shall not be stored for more than 15 days prior to use. The soiling solution shall be: 0.025 gm L a m p b l a c k

2.0 gm Tallow (Grinders No. 2)

6.0 gm White Mineral Oil 4 liters Carbon tetrachloride

H-3b, WASHING OF SOILED SWATCHES. Washing procedure shall be the same for all tests, varying only in kind of water as specified in each test. Procedure: Put 500 ml 1% soap solution (20°C to 25°C) in 800 ml beaker. Condition all swatches singly by 12 washing cycles, each cycle consisting of dipping up and down five times, handsqueezing and shaking fabric reasonably free of wrinkles and folds. After 6 washing cycles, leave the swatch immersed 5 minutes in the solution without agitation, and then continue remaining 6 washing cycles. Entire cleaning period shall not exceed 10 minutes. Rinse entire set (singly) in one 500 ml portion of same kind of water used for washing (minus the soap product). Dry at 100°C. Reflectance is determined for the center portion of each side of each swatch; each measurement is made with the other three swatches placed back of the swatch being determined. Reflectance measurements shall be made on a Multi-purpose Hunter Reflectometer. Wash one set in soft water (not above 171 pp, calculated as CaCO3) and another set in synthetic sea water. (For formula see P. 55.)

#### P-115-SOLIDIFICATION TEMPERATURE OF FATTY ACIDS

(Frequently referred to as the "titer") (U.S.P.)

PREPARATION OF THE FATTY ACIDS-Heat 75 cc of glycerin-potassium hydroxide solution made by dissolving 25 gm of potassium hydroxide in 100 cc of glycerin to 150°C in an 800-cc beaker, and add 50 cc of the clarified fat, melted if necessary, but do not allow the temperature to rise above 150°C. When saponification is complete, the mixture is homogeneous, with no particles clinging to the beaker at the meniscus. Pour the soap into 500 cc of nearly boiling distilled water in an 800-cc beaker or casserole, add slowly 50 cc of dilute sulfuric acid (made by adding 1 volume of sulfuric acid to 3 volumes of distilled water), and heat the solution with frequent stirring, until the fatty acids separate cleanly as a transparent layer. Wash the acids with boiling water until free from sulfuric acid, collect them in a small beaker, and place on a boiling water bath or steam bath until the water has settled and the fatty acids are clear. Allow the acids to cool, melt, and filter into a dry beaker while hot, and dry for 20 minutes

Test for Complete Saponification—Place 3 cc of the dry acids in a test tube and add 15 cc of alcohol. Heat the solution to boiling and add an equal volume of ammonia water. A clear solution should result.

Determination of the Solidification Temperature—Cool the dry, filtered acids to from 15 to 20 degrees above the expected reading, and transfer to a glass tube 25 mm in diameter and 100 mm in length, the glass being 1 mm in thickness. By means of a perforated cork fasten the tube in a wide-mouth bottle of clear glass, approximately 70 mm in diameter and 150 mm in height. Suspend a thermometer of Type V, in the melted acids so that it will serve as a

stirrer, cooling if necessary, and stir the mass slowly until the mercury remains stationary for 30 seconds. Then allow the thermometer to hang quietly, with the bulb in the center of the acids, and observe the rise of the mercury column. The highest point to which it rises is the Solidification Temperature of the fatty acids.

#### P-116-SOLUBILITIES

(U.S.P.)

The statements concerning solubilities given under the heading Solubility, in the Pharmacopoeial monographs are not intended as standards or tests for purity, but primarily as information required by those employed in connection with the preparation and dispensing of medicines. However, when a special test involving solubility is given, or in case of solubility of volatile oils in alcohol of specific strengths, the test for such solubility is intended as a test for purity and the substance must conform to the test.

The solubility of Pharmacopoeial compounds in the given solvents is considered to be of minor importance as a means for their identification or determination of purity; for these purposes dependence is placed upon the other tests directed in the monographs.

When the exact solubility of a Pharmacopoeial substance is not known, a descriptive term is used to indicate its solubility. The following table indicates the meanings of such terms:

Descriptive Terms	Relative quantity of solvent for I part of solute
"Very soluble"	
"Freely soluble"	From 1 to 10 parts
"Soluble"	From 10 to 30 parts
"Sparingly soluble"	From 30 to 100 parts
"Slightly soluble"	From 100 to 1000 parts
"Very slightly soluble"	From 1000 to 10,000 parts
"Practically insoluble"	More than 10,000 parts

#### P-117-SPECIFIC GRAVITY

When a sufficient quantity of material is available, the specific gravity of a liquid may be determined by floating a hydrometer in it at the required temperature, and reading the mark to which the hydrometer sinks. A Fisher Gravitometer, Westphal or Jolly Balance may be used in other cases. However, the pycnometer method is the one in common use. The method follows:

1. The pycnometer is carefully dried and weighed.

2. The instrument is then filled with distilled water at a lower temperature than that at which the determination is to be made. It is placed in a bath kept at the temperature of the determination, until no more water exudes and reweighed after the outside is dried.

The difference between the two weighings gives the "water value" of the instrument at the required temperature, and need be determined only once.

3. Operation 2 is repeated, after the instrument has been emptied and dried, using this time the fluid whose specific gravity is to be determined instead of water. The difference between this weighing and that obtained in (1), gives the weight of the same volume of fluid as the volume of water whose weight is given by the "water value." This difference divided by the "water value" gives the specific gravity of the fluid tested.

Example:

- (a) Weight of pycnometer empty = 18.306 grams.
- (b) Weight, filled with water at 25°C = 42.985 grams.

(c) Weight, filled with fluid at 25° C = 40.029

Hence, "water value" of the instrument at 25° C = 42.985 grams —18.306 grams or 24.679 grams.

Weight of same volume of fluid to be tested at  $25^{\circ}$  C = 40.029 grams —18.306 grams or 21.723 grams.

Hence,  $d_t$  of fluid tested =  $21.723 \div 24.679 = 0.8802$ . The accurate determination of the specific gravity of solids is more troublesome. The following method can be adopted in the case of powders insoluble in water:

1. Weigh a small amount of the powder, insufficient to fill the pycnometer.

2. Fill the pycnometer with distilled water and weigh.

3. Empty, and place weighed powder from (1) into bottle and fill with distilled water. Weigh again.

Add (1) to (2) and subtract (3). The difference is the weight of the water displaced by the powder. The determination should be conducted at some definite temperature. For solids soluble in water another liquid such as turpentine, oil, or alcohol is used in place of water, the specific gravity of the liquid employed being introduced as a factor in the calculation of result.

Note: Unless otherwise noted, U. S. P. XII Specific Gravity is determined at 25°C. The British Pharmacopoeia (1932) selects 15.5°C as the temperature at which specific gravity is to be determined. These temperatures apply in all cases unless otherwise noted.

#### P-118-SPECIFIC GRAVITY (FATS AND OILS)

(AOCS)

Note: If extremely accurate results are not required, determinations may be made by means of a Westphal balance or hydrometer of known correctness.

Weigh the pycnometer, which should be perfectly clean and dry, on an analytical balance; then fill it with recently boiled distilled water, previously cooled to 20°-23°C, allowing it to run down the side while holding the pycnometer in an inclined position so that it will not splash or form bubbles. Insert the stopper or thermometer and immerse the pycnometer in a bath of water which is held at 25°C ±0.1°C, keeping the entire bulb of the pycnometer covered with water. The pycnometer should stand in the water bath for one-half hour to insure that the water in it has acquired the proper temperature. The water in the bath should be kept agitated by air or stirring during the entire time to make sure that it has the temperature of 25°C throughout. Remove any water, overflowing the capillary opening, put the cap in place, take the instrument out of the bath, wipe the pycnometer dry with a cloth and weigh immediately. Ascertain the weight of the contained water at 25° C by subtracting the weight of the empty pycnometer from its weight when full.

To determine the specific gravity of oil at  $25^\circ/25^\circ C$ , cool it to  $20^\circ \cdot 23^\circ C$ , fill the pycnometer, using the same precautions to avoid the formation of air bubbles, insert the stopper or thermometer, and immerse the instrument in the water bath kept at  $25^\circ C \pm 0.1^\circ C$  for one-half hour. Take the pycnometer out of the bath, remove any excess oil from about the capillary opening, put the cap in place, wipe dry, and weigh. Subtract the weight of the empty pycnometer from its weight when filled with oil and divide the difference by the weight of the contained water determined above, the quotient being the specific gravity of the oil at  $25^\circ/25^\circ C$ .

If a fat is not liquid at  $25^{\circ}$ C, its specific gravity is determined at  $60^{\circ}/25^{\circ}$ C. The procedure is the same as above except that the melted fat is filled into the pycnometer at a temperature of  $56\text{-}58^{\circ}$ C, the oil being allowed to remain in the bath at  $60^{\circ}$ C  $\pm 0.1^{\circ}$ C for one-half hour. Cool to room temperature before weighing. Unless the pycnometer is of glass of very low coefficient of expansion, a correction must be made for expansion. The coefficient of expansion of ordinary glass is about 0.000025. In this case.

where F is the weight of oil at  $60^{\circ}$ C and W is the weight of water at  $25^{\circ}$ C.

Solid Wax or Fat (adapted from Fryer and Weston, "Oils, Fats and Waxes," Vol. II, 34, 1918.) - Prepare seven solutions of alcohol and water by means of a Westphal balance with densities ranging from 0.940 to 1.00 (water only) at 25°C differing by 0.01 percent, and keep in well-stoppered bottles. (Number them 1 to 7.) Melt on the water bath about 5 grams of the sample of solid fat or wax. See that the liquid is free from bubbles and quite clear; if cloudy, filter through a hot funnel and dry filter paper. Allow to cool slowly. When cool, cut out a small pellet of wax, and to prevent the formation of air bubbles brush cover with a wet camel's-hair brush. Test the solutions and see that they are about 25°C. Then place solution (1) in a tall-form beaker and immerse pellet of wax by means of forceps. If the wax sinks to the bottom, pour (1) back into its bottle, try solution (2), and so on through the series until a solution is found in which the wax floats.

Cool or warm the solution until it is exactly 25°C. Fill a burette with alcohol and add this drop by drop to the solution in the beaker until the pellet of wax just sinks, meanwhile mixing very gently with a stirring rod to prevent air bubbles from forming around the wax. If the amount of alcohol is exceeded, a drop or two of water may be added and the end point again obtained. Ascertain carefully the specific gravity of this solution by means of the Westphal balance.

This gives the specific gravity of the wax. Confirm this result by placing two more pellets of wax in this final solution. If the wax floats, test by adding a drop of alcohol to the solution, when it should slowly sink. If the pellet sinks, add water until it just rises and ascertain the specific gravity as before. Obtain two consecutive, concordant results. Specific gravity may also be determined by displacement in alcohol using an analytical balance, bridge, and beaker in the usual way.

#### P-119—SPECIFIC GRAVITY, FATS & FATTY OILS (U.S.P.)

PREPARATION OF SAMPLE—If a sample of oil shows turbidity owing to separated stearin, warm the container in a bath of water at 50°C until the turbidity has disappeared and the oil is clear. Thoroughly mix the clarified oil before weighing the samples. If the oil does not become clear on warming, filter it through dry filter paper in a funnel contained in a hot water jacket. Weigh at one time as many portions as are needed for the various determinations, using preferably a bottle having a pipette dropper, or a weighing burette. Keep the sample melted, if solid at room temperature, until the desired samples are withdrawn.

SPECIFIC GRAVITY-The specific gravity of a fat or

oil shall be determined at 25°C except when the substance is a solid at that temperature. In this case the specific gravity shall be determined at the temperature directed in the respective monograph and referred to water at 25°C.

Clean a pycnometer (use a Sprengel pycnometer or a Squibb pycnometer with a well-fitted capillary stopper) by filling it with a chronic acid cleansing mixture and allowing it to stand for at least 4 hours. Empty the pycnometer, and rinse it thoroughly with distilled water; then fill it with recently boiled distilled water previously cooled to about 20°C and place it in a constant temperature bath at 25°C. At the end of 30 minutes adjust the level of the water to the proper point on the pycnometer; put the perforated cap or stopper in place; remove from the bath, wipe dry with a clean cloth, free from lint; and after allowing to stand for 30 minutes, weigh. Empty the pycnometer, rinse several times with alcohol and then with ether, allow it to become perfectly dry, remove any ether vapor, and weigh. Ascertain the weight of the contained water at 25°C by subtracting the weight of the pycnometer from its weight when full.

Fill the clean, dry pycnometer with the oil at a temperature below that at which the determination is to be made; place it in a constant temperature bath at the specified temperature for 30 minutes; adjust the level of the oil to the proper point on the pycnometer; put the cap or stopper in place, wipe dry; allow to stand for 30 minutes; and weigh. Subtract the weight of the empty pycnometer from its weight when filled with oil, and divide the difference by the weight of water contained at 25°C. The quotient is the specific gravity at the temperature of observation, referred to water at 25°C.

#### P-120-SPECIFIC GRAVITY

(Fisher-Davidson Gravitometer Method) (Range 0.60 to 2.00)

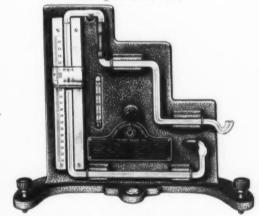


Figure 105. Fisher Davidson Gravitometer

GRAVITOMETER, Fisher-Davidson, a direct reading instrument for the determination of specific gravities of small amounts of liquid. Very accurate results are obtained using samples as small as 0.3 ml. Temperature changes for most organic liquids have little effect on the scale reading, average values observed at 15° to 25°C not differing from those observed at 20°C by more than 0.1 percent. With other solutions and liquids, a correction formula is provided for temperature adjustment.

Hydrostatic study has shown that if two manometers

containing liquids of different densities are connected to a common source of suction, the heights of the liquids in the connecting manometers are inversely proportional to their densities. With the Fisher-Davidson Gravitometer, the tubes are constructed so that the height or liquid level varies in one tube only, and a single direct reading is all that is required. One of the tubes is shaped in the form of a Z with an upper and lower horizontal arm, while the second tube is designed in the form of an L. The tubes are attached by rubber tubing and an outlet on the L-tube is connected to the pump, thereby permitting a partial vacuum to be applied simultaneously to both tubes. The tubes are mounted on a modern substantial support stand equipped with a universal level and thermometer. The stand can be adjusted to a level position by means of two screw legs on the front of the base.

If liquid is placed in each of the tubes and drawn up by the pump at the rear until the menisci of the liquid in the Z-tube rest in the upper and lower arms, only one variable level need be observed: that in the upright branch of the L-tube. The Z-tube thus insures, within limits, a fixed pressure difference between the atmosphere and connecting length of Z and L-tubes. The value of this fixed pressure varies directly with the density of the liquid in the Z-tube, and is conveniently measured by means of a scale graduated in specific gravity (ratio of the mass of the body at 20°C to the mass of an equal volume of water at 4°C).

The rubber suction pump is designed for ease of operation and is controlled by a small knob on the front of the instrument. A cursor with index line, magnifier, and vernier can be raised or lowered on the graduated scale and will read to the third decimal place. The scale is established using certified ethylbenzene as a standard and with this liquid in the L-tube, the Gravitometer will determine specific gravities from 0.60 to 2.00. For liquids of higher specific gravity the ethylbenzene is replaced by certified carbon tetrachloride and scale readings must be multiplied by a conversion factor.

For most organic liquids the standard Z-tube of 1.9 mm. bore, supplied with the apparatus, will be found satisfactory. If liquids of high viscosity, such as oils, are examined in the Z-tube, a slow attainment of equilibrium will result. For these liquids, a 4.0 mm. tube is supplied. With these two tubes, a full organic range can be covered. Since water and aqueous solutions tend to stick in capillary tubes, it is recommended that these solutions be tested in the 4 mm. tube. A special Z-tube of 0.8 mm. bore should be used with liquids of low viscosity.

#### P-121—SPECTRO PHOTOMETER, RECORDING PHOTO-ELECTRIC

(General Electric Company)

In the schematic diagram shown in Fig. 107, the collimator lenses and prism No. 1 produce a spectral image of slit No. 1 in a vertical plane normal to the mirror at the second slit. A portion of this spectrum is imaged by collimator lenses and prism No. 2 on slit No. 3.

Monochromatic light from slit No. 3 is plane-polarized by Rochon prism No. 1. The Wollaston prism generates two components, mutually perpendicularly polarized, which fall on standard and sample respectively. Rochon prism No. 1 is mounted in a bearing and is rotated by a cam arrangement. The angular position of this Rochon prism with respect to the Wollaston prism determines the ratio of the energy distribution in the two beams and hence, as will be shown later, is a measure of the reflectance of the sample in terms of the standard. Rochon prism No. 2 is mounted in the hollow shaft of a synchronous motor. The rotation of this element serves to vary the light intensity of the incident beams from minimum to maximum on the sample and the standard, out of phase with each other. A phototube views a frosted glass in the integrating sphere wall, the brightness of which is a function of the sum of



Figure 106. G-E Recording Photoelectric Spectrophotometer

normal to the surfaces, and covers a portion one inch in diameter. The frosted glass in the integrating-sphere wall is symmetrically located with respect to the sample and the standard positions.

Transmission measurements are made by using a reflection sample and a standard of the same material, and introducing the transmission specimen in the incident sample beam. Provisions are also made for placing a standard transmission specimen in the standard beam, Transmission samples up to 5 centimeters in length can be accommodated.

As can be seen from the description, the light incident on the sample and the standard is derived from the same source, thus eliminating from the measurement the characteristic of the source. Furthermore, the optical system is common to the sample and the standard, with the exception of one pair of decentered lenses, which are used to obtain wider angular deviation of the sample and the standard beams. Since the voltage amplifier and the thyratron stage amplify alike the current due to the light from both the sample and the standard, the measurement is independent of the characteristics of these units. As only

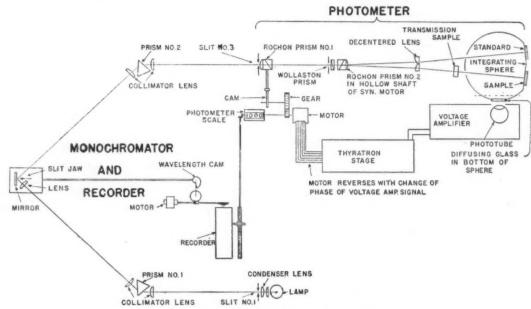


Figure 107. G-E Recording Photoelectric Spectrophotometer

the product of beam intensity and reflectance for both sample and standard. When the light reflected from the sample and standard is not equal, an alternating-current component is present in the phototube current. The phase of this alternating component with respect to the voltage applied to the synchronous motor determines which of the two reflected beams is the more intense. This amplified alternating component is then used to control, by means of the thyratron stage, the direction of rotation of the balance motor. This motor adjusts the Rochon prism No. 1 to obtain a redistribution of energy in the sample and the standard beam, thus removing the alternating component in the phototube current. The angular position of Rochon prism No. 1 is then a measure of the reflectance of the sample in terms of the standard.

The illumination on the sample and the standard is

monochromatic light reaches the phototube, the spectralresponse characteristic of the phototube does not enter into the result.

#### P-122-STABILITY, COLD WEATHER

Place two samples in an ice box maintained at from 30°F to 10 degrees below zero Fahrenheit, depending on the temperatures to which the product will be exposed. Products sold by door to door vendors should be stable to at least 0°F or they may either burst the container from freezing or separate on thawing out. If products are shipped by parcel post, they will usually have to be stable to only 25°F.

Keep one sample in the ice box continuously for 7 days, observing any changes that might occur at daily intervals. Bring to room temperature. The second sample is kept in the ice box overnight (at least 12 hours) and left at room temperature during the daytime for 7 days. Watch for any changes in appearance, separation or thickening. Compare the two samples. No appreciable change should occur under these conditions.

#### P-123-STABILITY, HIGH ALTITUDE

It is common knowledge that the atmospheric pressure at high altitudes is lower than at sea level. This lowered pressure can play havoc with a product. Emulsions in particular suffer from lowered atmospheric pressure. Creaming and oil separation occur more readily at lowered pressure in high altitudes than at sea level.

All solid or semi-solid products containing any entrapped air will creep out of the jar and mess up the labelling or carton if the cap is not seated tightly over the entire circumference of the jar top. Any slight crevice will allow the cream to come out as the air bubbles expand inside the jar.

Volatile liquids will evaporate more readily because of the lowered pressure. The loss may be great enough to render the package unsaleable.

To determine stability at higher altitude, a large vacuum dessicator can be used to hold the item under test while the pressure within is lowered to any desired manometer reading. The joint or seal on the dessicator must be a good one or the vacuum may be slowly lost. In fact, it is a good idea to have a vacuum pump connected continuously to maintain the desired pressure inside.

It takes as little as a few minutes to get results with aerated creams. Non-aerated products and liquids will take longer to show changes. In each case, the vacuum test must be made at temperatures of at least 100°F, P-124 and 30°F, P-122.

#### P-124-STABILITY, WARM WEATHER

Place two samples in a thermostatically controlled oven warmed to from 110 to 130° F, depending on the heat stability desired. Keep one sample in the oven for 30 days, observing any separation that may occur at intervals of about one week. The second sample is kept in the oven during the daytime for at least 8 hours, then allowed to stay at room temperature overnight. Do this for 30 days. Compare the two samples. No appreciable change should occur under such conditions of testing. Slight oil separation may occur so do not condemn the product. Do not confuse surface drying with oil separation.

#### P-125-STABILITY, ALL PURPOSE

To determine the all purpose stability of a cosmetic, method P-122 should be alternated after twelve hours with method P-124, for twelve hours. This changing from hot to cold, and vice versa, every twelve hours for ten changes will give a very good indication of the physical changes in the product that may result from extremes of hot and cold weather.

The hot and cold temperatures used will vary with the temperatures to which the product is exposed and will have to be established by the individual.

## P-126—SINCLAIR'S PROCEDURE FOR ERYTHEMAL TESTING OF SUNBURN PRODUCTS

(See also p. 582, CHEMISTRY AND MANUFACTURE OF COSMETICS by deNavarre for discussion of sunburn)

"The subject should be, preferably, of fair complexion

(of course untanned), as otherwise the required exposure times may be inconveniently long. He should be covered up to the neck with a completely opaque black cloth to prevent accidental exposure of parts of the body not being tested. Whoever conducts the test should at all times wear a pair of goggles, and this precaution applies also to the subject if he must face the arc lamp for more than a few seconds.

"A rectangular hole, about  $3\frac{1}{2} \times 4\frac{1}{2}$  in. is cut in the cloth mentioned above, exposing a convenient section of the back. The cloth is then pasted to the skin with strips of ordinary black paper passepartout tape about 1 inch wide; these strips are laid on around the borders of the hole. There is thus left uncovered a portion of the back measuring about  $2\frac{1}{2}$  in. x  $3\frac{1}{2}$  in. as shown in the figure below. This uncovered area is then marked off lightly with a pencil into 16 rectangles. Lotion No. 1 is then spread carefully in the upper row, lotion No. 2 on the second row, lotion No. 1 again on the third row, and lotion No. 2 again on the fourth row. The area is then exposed to radiation (see Figure 108) as follows:

COLUMNS

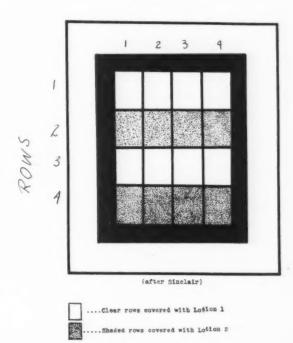


Figure 108. Patch Exposures

"The whole area is first exposed for, say, 5 minutes. Then a strip of the black paper tape is quickly pasted over column 1. The exposure is then continued for another 5 minutes, and then column 2 is covered similarly. Now the exposure is continued for 10 minutes and column 3 is covered. Lastly, column 4 is exposed for another 10 minutes, when the arc lamp may be removed or turned off. Thus, as a result of this procedure, we have columns, 1, 2, 3, 4, exposed for 5, 10, 20, 30 minutes respectively. It is unnecessary during the procedure to stop the exposure at any time since it takes only a second or two to paste on a strip of paper. In any case the arc should not be turned off during a run, as the characteristics of

the radiation change when the arc is allowed to cool off (see below).

"The comparison exposure on the bare skin is then made on a much smaller area in the *immediate neighborhood* of the area tested with lotions. This is done exactly as before after shifting the cloth and leaving an exposed area of bare skin about the size of one of the rows described above. This area can then be conveniently divided into three parts, exposed for 2, 3, 4 minutes or 3, 4, 5 minutes respectively, depending on the sensitivity of the subject.

"The visual observation of the erythema produced should take place about 20 hours after the exposure. At this time the erythema is most perceptible and tanning has not yet begun. The observations are made as follows:

"First, observe which portion of the exposed bare skin has a minimum perceptible erythema. This estimate of just how much is 'minimum perceptible' is to a certain extent arbitrary. It can be described as that portion which is definitely and without doubt a pale pink color, but not yet a deep pink. The edges of this area should be fairly distinct. After a little practice the tester can reproduce his estimate quite well.

"Second, observe the section of the lotion-covered area which also has a minimum perceptible erythema. This might be, for example, in column 3 for lotion No. 1. Since the time for column 3 is 20 minutes, this would mean that lotion No. 1 is quite effective, that is about 20/3 = 7/1approximately, assuming that the time for a minimum perceptible erythema on the bare skin is about 3 minutes, the most usual time. It will probably happen that no portion of rows 1 and 3 will appear to be the minimum perceptible. For example, column 2 might appear too light and column 3 too red. If so, a fairly good value can be obtained by interpolation. In any case a second run should be made, altering the times for the different columns according to the first test. Often a time ratio between adjacent columns of 11/2 to 1 is better than the 2 to 1 ratio assumed in the example cited above.

"In general, the exposure times depend upon the sensitivity of the subject's skin and upon the lotion. Consequently, the exact times to be used for the first run can be determined only by a judicious guess, and by making the total spread of exposure time long enough. Comparisons can be made between areas which have more than the minimum perceptible erythema, but it is very difficult to reproduce results for more than twice the minimum, since further exposure does not increase the redness proportionately but merely deepens the burn.

"The exposures are to radiation at a distance of 6 inches from a quartz mercury 'Uviarc' run at 3 amps. and 45 volts. The burner is  $2\frac{1}{2}$  inches long and  $1\frac{1}{2}$  inches in diameter, and has a cylindrical parabolic reflector  $3\frac{1}{2}$  inches long and 3 inches wide. It is tilted at 30 degrees from the vertical, and has no container surrounding it. Wavelengths between  $2800\text{-}2900\text{\AA}$  are filtered out with a piece of 'Corex D' glass 2 millimeters thick. Exposures should not be begun until the arc has been running about 10 minutes since the relative intensity of the longer wavelengths as well as the total intensity is low until the arc is warmed up.

"Any other low voltage quartz mercury are can be used after its relative intensity has been determined by test exposures." Preparations having an erythemal quotient of less than 2.00 do not give satisfactory skin protection.

#### P-127-SUNBURN PROTECTION

(Cream Sunburn Preventative) (OQMG No. 102 — Oct. 11, 1943) (Tentative Specification)

E-1. Protection against sunburn. Cream meeting this specification shall afford such protection against sunburn that 2.5 milligrams of cream spread evenly over 1 square centimeter of skin will attenuate erythema production to one-tenth of that produced on unprotected skin as described in paragraph F-3a.

F-3a. The attenuation of erythema production by an appropriate carbon arc to one-tenth will be accepted as satisfactory protection, i.e., the amount of cream stated in paragraph E-1 shall offer such protection to the skin against carbon are rays (described below) that time required to produce an erythema on protected skin is ten times that required to produce a comparable erythema on a similarly located area of unprotected skin. (A piece of clear glass pressed against the skin causes erythema to disappear, but causes no change in color due to tanning.) An appropriate carbon arc is the "Eveready, Model A-2, National Carbon Co., with therapeutic 'C' carbons used at a distance of approximately 24 inches, with a filter of Corex D glass 3 mm. thick interposed; or a source having the same spectral distribution. 'Average untanned skin' shall be defined as an area of skin of the torso of an individual who is neither extremely prone, nor extremely refractory to sunburn, which has not been exposed within six months to sufficient sunlight, or sunburn, producing radiation from any other source to produce erythema."

#### P-128-SUNBURN PROTECTION

(Lipstick-Anti-Chap) (OQMG No. 105—March 30, 1943) (Tentative Specification)

E-1. Transmission of harmful rays—Lipstick, anti-chap, shall not, when tested according to procedure outlined in paragraph F-3a, show an ultra-violet light (2900 to 3150 Angstrom units) transmission greater than 5 percent for a film thickness of 0.05 0.005 mm.

F-3a. Ultra-violet transmission—Test shall be conducted by an approved laboratory using a hot mercury quartz tube as a light source. Measurement shall be made of the transmission of the following line of the mercury spectrum: 2890, 2970, 3020, 3130, 3340 Angstrom units, using quartz glass plates for supporting sample.

#### P-129-SUNBURN TESTING

Using an Orelup Radiometer (W. Mueller, Proc. Sci. Sec. Toilet Goods Assn. January 26, 1944)

This is a modification of the Coblentz ultra-violet intensity meter. It eliminates the drawbacks of the various methods referred to since it gives instantaneous readings of absorption or transmission on a percentage basis. It is equally applicable for use in sunlight as well as in artificial light, and is simple to operate, requiring neither technical nor scientific training. In this instrument, a titanium photoelectric tube, which is sensitive only to the energy in the 2800Å to 3340Å region, is used. If a broader range

is desirable, a thorium photoelectric tube, having a response to the wavelengths between 2500Å and 3600Å, can be used. The current generated by exposing the tubes to a light source emitting energy in their respective sensitivity band is amplified by balanced screen grid tubes and the plate current read directly on a sensitive microameter. This is analogous to the manner in which the weak electric signals picked up by a radio aerial are amplified and made audible through the loud speaker. The Orelup meter makes the signals visible.

In testing sunscreens with the Orelup meter, two cells are used, each consisting of two ground and polished Corex A or quartz plates separated by two metal strips of any desired thickness. In our work, we use separator strips 1/1000 of an inch thick; determinations made with a microscope have shown this to be the average thickness of films of sunburn preventive preparations applied to the skin. One of the cells is filled with the solvent used to dissolve the compound to be tested. A drop or two of the solvent is applied to the lower plate of one of the cells, the aluminum strips placed in position, and the top plate applied with a sliding motion, in order to guard against the formation of air bubbles. The plates are held together by capillary attraction. This cell compensates for the absorption of the solvent and the reflection of the polished surfaces of the plates. The other cell is filled with a solution of the material to be tested. To facilitate quick readings and checks, the two cells are clamped side by side in a frame and covered with an opaque plate.

Equilibrium is first established in the circuit, the aperture, or window, in the top of the case that houses the tubes being in the meantime covered with an opaque plate. After equilibrium has been established, the meter is adjusted to obtain a zero reading on the ammeter when the aperture is covered and a reading of about 40 to 45 milliamperes when the aperture is uncovered. The frame holding the charged cells, which are now covered with the opaque plate, is then placed on the top of the meter, with the solvent cell covering the aperture. A new zero reading is then taken, the opaque plate removed, and a reading taken of the solvent cell. The frame is now slid over until the cell containing the sunscreening material covers the aperture and a reading taken. A zero adjustment is made between each cell test. The difference between the two readings indicates the absorption of the sunscreen tested. Thus: if the solvent cell gives a reading of 48 milliamperes and the other cell a reading of 4 milliamperes, the simple equation of 4:48 = X:100 gives the transmission X in percentage as 8.33. Deducting this from 100 gives the absorption of the sunscreen: 91.67 percent.

Pure white mineral oil has but very little absorption in the 2920Å-3200Å region. It therefore makes an ideal filler for the solvent cell when readings of the total absorption of screen and solvent are required. To make stability tests, the cell containing the sunscreening material is left in place on the meter and intermittent readings taken as desired, the meter being occasionally checked with the solvent cell and new zero adjustments made, if necessary.

Some interesting results have been observed in making stability tests. Most compounds become transparent to ultra-violet after a short exposure. As a rule, this happens with compounds having a very high filtering action. Compounds having a medium filtering action resist eventual transparency longer. On the other hand, the absorption

of a few compounds increases; that of one increased as much as 300 percent during a 10-minute exposure to sunlight. Under continuous exposure, all compounds even-

tually lose their absorption.

Based on the individual absorption curves of these products, as shown in the International Critical Tables, a mixture of 0.4 per cent of diphenylbutadien, 0.6 percent of stilben, and 0.45 percent of cinnamic acid should have 90-percent absorption in the region from 2566Å to 3428Å. Initial readings taken with the Orelup meter corresponded very closely with this figure. However, after continued exposure of the mixture to sunlight, the readings dropped rapidly, reaching zero after about 5 minutes. While the mixture was stable to the mercury vapor arc, it was unstable to sunlight. This illustrates the weakness of spectrophotometric tests unless they are made before and after exposing the material being tested to sunlight for a certain length of time.

#### P-130-SUNBURN TESTING

Translating Lamp Results Into Terms of Sunlight (W. Mueller, Proc. Sci. Sec. Toilet Goods Ass'n, Jan. 26, 1944)

The following are the mathematics involved in translating the time required to produce a minimum perceptible erythema on the skin when it is protected by a given sunburn preventive preparation and exposed to a mercury vapor arc lamp into the maximum safe exposure allowed by the preparation in sunlight:

Percentage Transmission 
$$=\frac{100}{T}$$
,

T being the time in minutes required to produce a minimum perceptible erythema when the skin is protected by the preparation and exposed to a mercury vapor arc lamp equipped with a Corex D filter and adjusted to produce a minimum perceptible erythema on unprotected skin in 1

To correlate the results obtained under the lamp with the erythemal effects of sunlight, a safety factor of 20 percent is added to compensate for infra-red and other radiation present in sunlight; loss of sunscreen through evaporation, absorption, perspiration, and other factors developing during prolonged exposure to sunlight. Thus

Percentage Transmission in sunlight 
$$=\frac{100}{T} + 20$$
.

Using 24 as the time in minutes required to produce a minimum perceptible erythema on unprotected skin when exposed to June sunlight at midday, the time (T<sub>1</sub>) in minutes required to produce the same result when the skin is protected by the preparation will be

$$= (100 \times 24) \div \frac{100}{T} + 20.$$

According to Luckiesh, the time required to produce a vivid erythema (the maximum sub-injurious tolerance) is 21/2 times that required to produce a minimum perceptible erythema. Using this factor of 21/2, the maximum safe exposure allowed when using the preparation being tested  $= T_1 \times 2.5.$ 

Using the foregoing calculations, it is seen that if the skin protected by the preparation develops a minimum perceptible erythema under the lamp after a 14-minutes'

exposure, the preparation will protect against the injurious effects of sunburn for 221 minutes.

Plotting the results of lamp tests of a sunburn preventive preparation on a chart based on the foregoing calculations gives a comprehensive picture of the actual protective properties of the product; much more so than a spectrophotometric chart, which shows only absorption curves and which gives no indication of the effectiveness of the product under actual conditions of use in sunlight.

TABLE 12

Charting	Results of Ski	n Tests
A	В	С
Minutes	Minutes	Minutes
20	96	240
19	95	237
18	94	235
17	93	232
16	91	228
15	90	225
14		221
13	87	217
12	85	212
11	83	207
10	80	200
9	78	194
8	74	184
7	70	175
	65	162
5	60	150
6 5 4 3	53	133
3	45	113
2	34	85
1	24	60
0	0	0

A—The figures in this column show the time required for the production of a minimum perceptible erythema when the skin protected by preparation tested is exposed to a mercury vapor arc lamp equipped with a Corex D filter and adjusted to produce a minimum perceptible erythema in 1 minute on average untanned skin.

B—These figures are the sunlight equivalents of those in Column A; they give the exposure in minutes to June sunlight required to produce a minimum perceptible erythema when using the preparation tested.

C—In this column, the figures in columns A and B are translated into terms of maximum safe exposure. They show the length of time for which the preparation tested will protect the skin against harmful sunburn.

The horizontal line 14-88-221 illustrates the method of charting results. It shows that a 2-percent concentration of monoglyceryl p-aminobenzoate in 50-percent alcohol retards the production of a minimum perceptible crythema for 14 minutes. As shown in Column B, this figure is the equivalent of an exposure of 88 minutes to June sunlight. Therefore, as shown in column C, the solution tested offers 221 minutes' protection against harmful sunburn.

#### P-131-SURFACE TENSION & INTERFACIAL TENSION

The ring method has become generally accepted as the means of determining both surface tension and interfacial tension. To give directions for properly using a surface tension or interfacial tension measuring balance would require much space. The suppliers of this equipment, such as the unit shown in figure 31, have special bulletins on the use of the particular instruments.

Two general types of instrument are best known. One is patterned after an ordinary analytical balance while the other is an especially designed unit. Both utilize the ring principle and in each case force is measured in pretty much the same way.

#### P-132—AMERICAN INSTITUTE OF LAUNDERING METHOD FOR TENSILE STRENGTH TEST OF ANTIPERSPIRANTS

Samples of cotton, silk, rayon, and wool are impregnated with the antiperspirant; treated and original fabrics

are placed in an electric oven for 48 hours, the temperature being maintained at 98°F.

At the end of 48 hours at 98°F, the fabrics are removed from the oven, washed once in the commercial laundry departments of the American Institute of Laundering, using a white work formula for the cotton fabric; silk and rayon formula for the silk and rayon fabrics; and a wool



Figure 109. Scott Tensile Strength Tester

washing formula for the wool fabric. After washing, the samples are hydro-extracted to remove excess water, and are finished by pressing, after which they are allowed to condition to standard temperature and humidity and are tested for tensile strength.

Tensile strength tests are conducted with a Scott Tester, grab method, employing 3" back jaws and 1" front jaws, upper and lower jaws spaced 3" apart, and the pulling jaw traveling at a speed of 12" per minute. Five breaks are made in the warp of each fabric, and the average of the five breaks used.

(Chapter IV continues in subsequent issue.)
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